Digitized by the Internet Archive
in 2014

https://archive.org/details/wildlifeinnorthc61nort

C45
1:61/1

WILDLIFE IN NORTH CAROLINA

JANUARY 1997 $1.50

N.C. DOCUMENTS
CLEARINGHOUSE

DEC 31 1996

N.C. STATE LIBRARY
RALEIGH

1997

1947

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION
50TH ANNIVERSARY BIENNIAL REPORT
JULY 1, 1994-JUNE 30, 1996

◆

North Carolina Wildlife Resources Commission

512 N. Salisbury Street, Raleigh, North Carolina 27604-1188

His Excellency, The Governor Of North Carolina
Members of the General Assembly
Raleigh, North Carolina

I am pleased to present to you the 23rd Biennial Report of the North Carolina Wildlife Resources Commission. This report reflects the Commission's activities and accomplishments for the period beginning July 1, 1994, and ending June 30, 1996.

As chairman of the North Carolina Wildlife Resources Commission, I am pleased to report that during the biennium, the Wildlife Endowment Fund reached a balance of nearly $33 million, which includes over $22 million in principal. This Fund is supported entirely through the sales of lifetime licenses, lifetime magazine subscriptions and contributions, and only the interest can be spent to support the agency's many programs.

A number of significant accomplishments took place during the biennium, including the Commission's approval of a point-of-sale, computerized license sales program, and the installation of a toll-free telephone system to allow purchases of hunting and fishing licenses with credit cards. Also, with the acquisition of Green River and other Game Lands, the amount of land open to public hunting was increased by over 18,500 acres.

A major success story in game management took place during the biennium with the completion of the turkey restoration program. North Carolina's wild turkey population has grown from about 2,000 birds in 1970 to more than 86,000. Also, the white-tailed deer population reached a record high of 1 million. A new youth fishing program was implemented, and the mapping of all the state's trout streams was completed. The efficiency of our wildlife officers was enhanced with the acquisition of new radios, an updated communications center and an improved tower relay system that can maintain contact with officers in 90 percent of the state. The main building was completed for the Pisgah Wildlife Education Center which is under development, and the Center attracted more than 100,000 visitors in 1996. Reaching the sportsmen and citizens of the future also played a key role as N.C. WILD and N.C. CATCH saw further expansion in the schools through a growing network of workshops for teachers.

Our achievements during this biennial period would not have been possible without your support, and the support of the legislature, sportsmen and concerned citizens of North Carolina. We sincerely express our appreciation, and we pledge our continued efforts to ensure a sound future for our wildlife resources and the habitat we share with them.

Respectfully yours,

John F. Lentz

John F. Lentz, Chairman

January 1997
Volume 61, Number 1

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Nancy M. Childs/Assistant Art Director
Kimberly K. C. Schott/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

CONTENTS

2 A Legacy of Leadership

4 Division of Enforcement

8 Division of Wildlife Management

16 Division of Boating and Inland Fisheries

24 Division of Conservation Education

28 Division of Administrative Services

32 Personnel Section

Cover *The Wildlife Commission celebrates a half century of service.*

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

A Legacy of Leadership

The N.C. Wildlife Resources Commission in the past biennium continued its progress in regulating and managing fishing, hunting and boating in North Carolina, the major charges to the Commission, which enters its 50th year during 1997.

Authorized by the General Assembly in 1947, the Commission has been so successful in its programs that several other states in the early 1950s began using the North Carolina system as a model to set up their respective wildlife and fish agencies. In later years, the Commission introduced innovative programs that have been copied by other states.

John F. Lentz of Ellerbe is chairman of the Commission, whose membership was increased by the General Assembly in 1994 from 13 to 17. Bobby N. Setzer of Cullowhee is vice-chairman. Other members are C.J. Belch Jr. of Roper, James "Jon" Black Jr. of Charlotte, Cy W. Brame Jr. of North Wilkesboro, Ovide E. de St. Aubin of Siler City, Junior Winford Dew of Hallsboro, Lawrence "Larry" Diedrick of Rocky Mount, J. Robert Gordon of Laurinburg, Russell M. Hull Jr. of Elizabeth City, John W. Parks III of Gastonia, John E. Pechmann of Fayetteville, Charles R. Preston of Conover, Eugene Price of Goldsboro, Roy Gerrodd Sowers III of Burgaw, J. Ralph Squires of Charlotte and Jerry W. Wright of Jarvisburg.

In this photo from the 1950s, commissioners are being sworn in at the Capitol Building in Raleigh. The Wildlife Commission's longest-serving executive director was Clyde Patton, who held that position from 1948 until he retired in 1976.

N.C. WILDLIFE RESOURCES COMMISSION

Charles R. Fullwood is executive director of the 500-position agency, and Richard B. Hamilton is assistant director. The executive director is hired by the Commission, and he is responsible for hiring staff personnel. Commission staff members work in five sections—law enforcement, wildlife management, fisheries management, conservation education and administration. Field personnel from the wildlife and fish management and law enforcement divisions are stationed in every section of the state.

The Commission again enjoyed a successful financial biennium, with a June 30, 1996, cash balance of $11,694,189 in the Wildlife Fund, the day-to-day operating account. The Wildlife Endowment Fund, which continues to generate inquiries about the authorization and operation from other states, had a balance of $32,803,611. That includes $22,595,466 in principal that, by law, cannot be spent—only the interest may be spent, and then only to improve Commission programs. Since the Endowment Fund's inception, the Commission has used $10 million of interest from the fund to finance programs.

The Endowment Fund was authorized by the legislature in 1981, making North Carolina the first state to have such a program. The fund consists of revenues from the sale of lifetime hunting, fishing and combination licenses and lifetime subscriptions to the agency's monthly publication, *Wildlife in North Carolina*, as well as earmarked contributions. Several other states in recent years approved similar endowment programs with lifetime licenses as the base. Two others recently requested information on the highly successful North Carolina Wildlife Endowment Fund.

A step forward was made during the biennium when the Commission approved a customer-support service that will provide a point-of-sale computerized license sale system. This program will become operational July 1, 1997, and license agents now are receiving training in use of the equipment. In addition, a toll-free telephone system was added to allow purchases of hunting and fishing licenses with a touch-tone telephone and VISA or MasterCard.

One of the major success stories in game management came with the completion of the wild turkey restoration program during the early summer of 1996. The wild turkey population in North Carolina has grown from about 2,000 birds in 1970 to more than 86,000 by mid-1996. Through purchase of wild turkeys in cooperation with the National Wild Turkey Federation and its North Carolina chapter and by live-trapping birds in the state, the restoration program was completed. While this has been a long-term program, much of the progress was made in the past seven years as the Commission authorized an expanded restocking effort.

Wild turkey populations in all areas of the state will be monitored, and additional stockings will be made as needed to increase the population to huntable levels. While success has been seen in several areas of the state, the wild turkey numbers have increased more in the Mountains in recent years than in other sections.

Deer populations also continue to improve and now number about one million. In the mid-1960s, deer

seasons were closed in many sections, but the population has spread and now each county has an open season.

In an effort to increase the quail populations, the Commission is cooperating with N.C. State University on a nest-predator study in eastern North Carolina to determine the effect of predators on quail.

The Boating and Inland Fisheries Division reports that the Roanoke River experienced a massive fish kill during the first year of the biennium, followed by a recovery during the second year. The kill was caused by a combination of unusually high water levels, a long period of extremely high water temperatures and a sudden decrease in water flow in the river, causing the oxygen-depleted water backed up in adjacent swamps to rush into the river channel, trapping fish there. Striped bass recovered quickly, with a very good 1996 spring spawn, and the Watha hatchery provided more than 80,000 fish of other species to offset losses. The stocking included 20,000 each of largemouth bass, channel catfish, bluegill and redear sunfish, commonly referred to as shellcracker. The division will stock the same fish in equal numbers in 1997.

Youth fishing education took a giant step forward when the Fishing Tackle Loaner Program was initiated in the Raleigh-Wake County area. The program checks out fishing tackle to anglers in the same manner a library loans books. Six lakes are currently in this program, and the program will be expanded in 1997 to Greensboro and Charlotte.

Mapping of trout streams was completed during 1996, and the color-coded map will be available in 1997. The purpose of the map is to let trout anglers see at a glance the location of trout streams throughout the Mountain region of the state.

Improvement in communications equipment was one of two highlights for the Division of Law Enforcement. New radios were provided all officers, and the communications center was updated and renovated at a cost of approximately $900,000. With the improved tower relay system, the Raleigh office now can maintain contact with officers in more than 90 percent of the state. While a few areas in remote regions are not yet covered, the division continues to add tower sites to provide statewide coverage.

Enforcement efforts received a boost with establishment of a canine program that puts one German shepherd trained in enforcement work in each of the nine districts. Officers and dogs were trained under Master Officer Mike Criscoe of District 3. Criscoe and his dog, Link, made up the Commission's only canine team for the past eight years. North Carolina citizens contributed all except two dogs for the program. The dogs not only are being used for enforcement but also are available for search-and-rescue missions.

KEN TAYLOR

KEN TAYLOR

***The N.C.** Wildlife Resources Commission consists of 17 commissioners and a professional staff of 500 men and women across the state. John F. Lentz (left) is the Commission's chairman and Charles R. Fullwood (right) is the executive director.*

Progress continued to be made by the Conservation Education Division on the Pisgah Wildlife Education Center, and the division continued receiving accolades for its work in the field of conservation education and publications. The Pisgah Center attracted more than 100,000 visitors during 1996. The main building is complete, and rest rooms are being constructed. Rest rooms, an outdoor classroom and outdoor exhibits will be completed during 1997-98.

Honors came to the division as it received awards for *Wildlife in North Carolina*, with a first place in four-color publications. The Catch program won first place in Education competition. Celeste G. Wescott received the International Project WILD Coordinator of the Year Award, recognizing her as top state coordinator in the international association. Ted Dossett was honored during a Montana film festival for producing and filming a video.

Since authorization of the Wildlife Resources Commission, service and progress have been foremost in agency objectives. Commissioners, the executive director and staff will strive to make the next half century as successful as the first 50 years. ⊠

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Wildlife Enforcement

Fifty years ago, when the N.C. Wildlife Resources Commission was established as a new department separate from the Department of Conservation and Development, there were 104 wildlife protectors positions in the entire state. The starting salary for a local county wildlife protector was $1,800 per year. Besides enforcing all game and fishing laws, officers distributed and sold hunting, trapping and fishing licenses. The 1947 Game Protector's Manual was printed front and back on a folded 8½-by-11-inch sheet of paper. The Law Enforcement Division budget for the entire year was $204,816.13. And during that first year, protector made 5,184 wildlife cases.

JACK DERMID/N.C. WILDLIFE RESOURCES COMMISSION

***Making sure** that hunters are equipped with valid licenses has always made up a good portion of wildlife enforcement officers' time.*

Much has changed since that time. The Division of Enforcement now has 214 sworn officer positions, and its annual budget exceeds $12 million. The starting annual salary for a wildlife enforcement officer currently is $23,656. The one-page instruction sheet has been replaced by a 2-foot-high pile of manuals and regulations. And approximately 18,500 hunting and fishing violations are annually detected, in addition to another 14,000 boating violations.

In a world that is going high tech, fish and wildlife agencies have found that wildlife enforcement officers must rely on modern technology and ongoing training to keep pace with the demands placed on them. The Division of Enforcement has acquired new computers, laser printers and modems for the lieutenants in each of the nine wildlife districts. All districts are connected electronically to the Raleigh office. Districts will soon be able to transfer activity reports directly and without the delays and errors caused in data processing. This also will enable division administrators to have direct and immediate access to activity and prosecution records and have direct electronic-mail links with field personnel.

Training continued to be a top priority for North Carolina wildlife enforcement officers during the past two years. During the 16-week wildlife school, recruit officers spent several months at the Institute of Government on the campus of the University of North Carolina in Chapel Hill and another month at the N.C. Justice Academy in Salemburg, where they were trained in firearms, driving, defensive tactics, civil disorders and hunter safety. In addition, recruit officers spent several days and nights at Jordan Lake learning boat-handling skills and three days at the Highway Patrol Driving Facility in Garner acquiring pursuit-driving skills. After graduation, the new officers entered the second phase of their training—a six-month field assignment working under the direct supervision of a veteran training officer.

In-service training for all wildlife officers continued during the year, with all supervisors also receiving Developmental Supervisors Training. Officers in each district received training in firearms and ASP baton (collapsible baton), blood-borne pathogens, and wildlife and boat law review. All district lieutenants participated in a three-day hunter-education workshop at Fort Bragg, where special emphasis was placed on learning education skills in bow hunting. All District 2 officers were certified in the 32-hour Standardized Field Sobriety Training. In addition, District 2 officers also completed the United States Power Squadrons boating course to brush up on their skills in navigation and boat handling. Ten officers from Districts 3 and 5 attended the 1996 Underwriters Laboratory Boating Accident Investigation School. While most of the training is mandated, some officers sign up for education or skills courses on their own. Lieutenant Chip Simms and Officer Ashley Thompson of District 5 recently enrolled in law enforcement Spanish language classes to prepare them better in dealing with the growing Hispanic population in the state.

New schemes by game violators have tested the ingenuity of officers in recent years. In several instances involving blatant breaking of wildlife laws,

***District 2** wildlife enforcement officers inspect boats during a spring equipment check to ensure that they are ready for the spring and summer fishing and boating season. From left to right are Lt. Tony Williams, Sgt. Conley Mangum and Master Officer Milton Jones.*

KEN TAYLOR

game violators employed radio scanners to monitor wildlife enforcement frequencies and two-way radios with posted lookouts to warn other hunters of an approaching wildlife officer. Aware of this problem, the Division of Enforcement has improved its communications system and radio procedures by purchasing new radio communications equipment and installing additional repeater sites so that all areas of the state can have reliable and secure communications.

While much emphasis has been placed on modern high-tech improvements, the Division of Enforcement literally "went to the dogs" in another area. The canine (K-9) enforcement program was expanded to all nine districts of the state. Beginning in January 1996, eight German shepherds and their handlers underwent an intensive 15-week training program taught by Master Officer Mike Criscoe. In addition to training at the N.C.

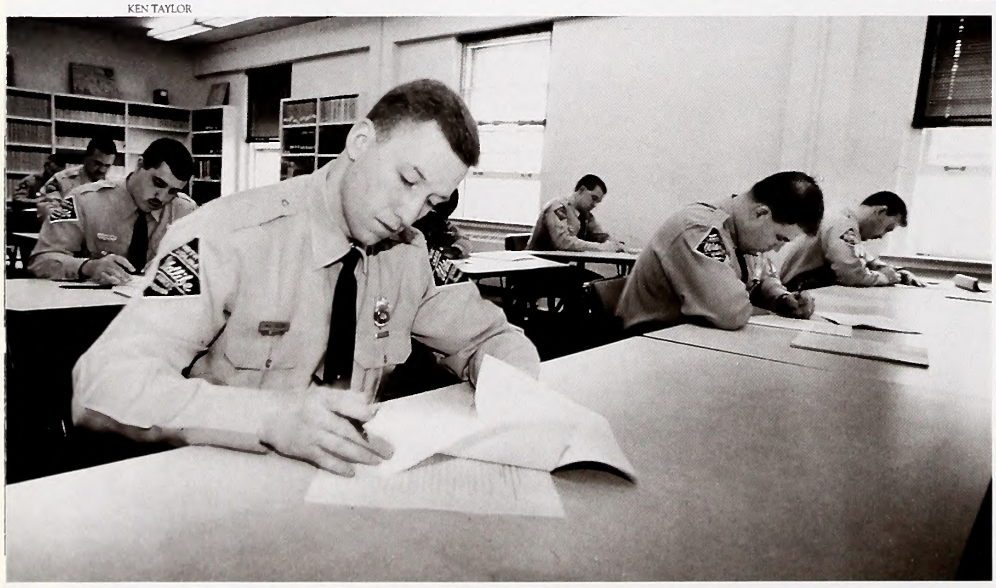
KEN TAYLOR

***During basic** training, new enforcement officers also learn to interact with school children in educational settings. Here one new officer works with children in a N.C. WILD environmental education program in Chapel Hill.*

Wildlife Enforcement

KEN TAYLOR

***Wildlife** enforcement officer Mike Owens checks hunters' licenses with his canine colleague, Buddy. The canine enforcement program expanded to all nine wildlife districts during the biennium.*



KEN TAYLOR

***Seasoned** enforcement officers are offered regular advancement opportunities. Sergeant's exams are administered twice a year at the Institute of Government in Chapel Hill.*

Justice Academy in Salemburg, the dogs and their handlers trained with the U.S. Army's Delta Force and canines from Fort Bragg. The dogs were trained to find fish, game, weapons and ammunition by smell and to protect their handlers on command. Although the class has ended, the K-9 unit will undergo training sessions each month to keep handlers and dogs at top performance levels. The K-9 teams already have been used to detect some wildlife violations, and it is expected that their value will be fully realized during the 1996-97 hunting season.

The Wildlife Resources Commission set up $23,000 during the biennium to start the K-9 program, purchase supplies and materials, and pay for veterinary services. However, most of the dogs and much of the equipment used were donated from sportsmen and other people across the state.

Officers and dogs successfully completing the class and their respective assignments are as follows: District 1 (Ahoskie), Tony Pennell and Beau; 2 (Deep Run), Paul Linder and Bear; 3 (Kittrell), Mike Criscoe and Link; 4 (Raeford), Sherwood Faircloth and Lancer; 5 (Oxford), Michael Owens and Buddy; 6 (Huntersville), Michael Loukos and Raleigh; 7 (Tobaccoville), Carey Bostic and Jake; 8 (Morganton), John Howell and Luke; and 9 (Tuckasegee), Vance Gibson and Max.

Law enforcement departments, especially sheriff's deputies who are stretched to cover vast areas of land in North Carolina, often call upon wildlife officers for assistance or backup because of their reputations as skilled law enforcement professionals and their knowledge of local woods and waters. Commission-owned aircraft and boats often are employed in searches for missing or escaped persons. When Hurricanes Bertha and Fran came ashore on the North Carolina coast during the summer of 1996, wildlife enforcement officers joined other law enforcement and military personnel in securing coastal areas and providing emergency assistance to inland residents caught in rising flood waters.

The enforcement of boating laws places wildlife officers in one of the most varied and unusual environments in the field. They often work alone, many times at night. They frequently encounter intoxicated and belligerent boaters, and if trouble arises, their closest backup is often an hour away, if it exists at all. There's no calling a tow truck for stranded, wrecked or seized boats, and often the closest land access to an immediate problem may be several miles away. Officers are often called upon to investigate a serious accident that no one saw, one with no witnesses to

interview and no skid marks to aid in the reconstruction.

During the past boating seasons, North Carolina wildlife enforcement officers on boating patrol became more visible to the public. All fiberglass patrol boats purchased during the past two years were prominently marked and identified as state law enforcement vessels. The high-visibility law enforcement presence on the water has had an immediate and positive impact on safe boat operation. The public is more aware of the wildlife officers' presence on the water for assistance and security and to provide the minimum level of necessary control.

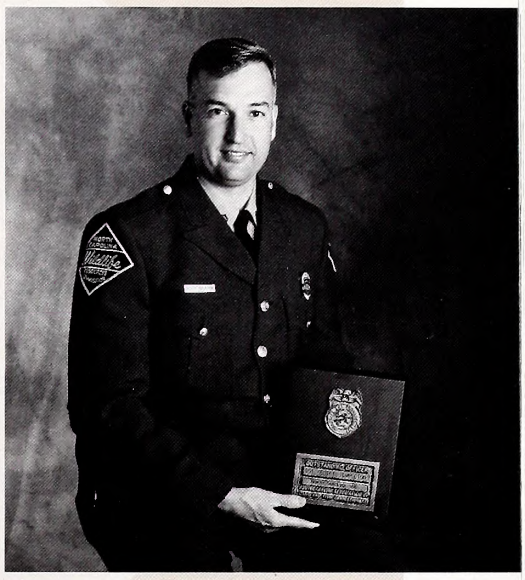
The winter waterfowl season brings its own challenges for wildlife enforcement officers. Raw winds, freezing rain and rough seas keep ducks flying low and are welcomed by hunters clad in foul-weather gear and hunkered down in hunting blinds, but they are tough conditions for wildlife officers to cope with as they run from blind to blind. To make the work more bearable for wildlife officers in coastal areas this year, the Division of Enforcement has purchased goggles and anti-exposure coveralls similar to those worn by Coast Guard personnel on arctic tours of duty.

Another problem officers have encountered during winter waterfowl season has to do with their boats themselves. Boats large enough to handle the seas and rough conditions in the sounds may not be able to get close enough to shallow areas and blinds where ducks are feeding and flying. To deal with this problem, the Division of Enforcement purchased two specially designed 22-foot-long, flat-bottomed Core Sound-type fiberglass skiffs powered by 150-horsepower jet outboard motors. While large enough to take the rough water of the sounds, these boats, with sheltered operator areas, are capable of being operated in less than 12 inches of water. The agency also purchased a number of smaller, heavy-duty aluminum boats to use in waterfowl law enforcement.

As this biennium closes out 50 years of service to the public, the Wildlife Resources Commission's motto, "More sport for more people, equal opportunity for all," has served it well. The Division of Enforcement can take pride in its role. Wildlife enforcement officers have become more professional, adaptive and effective in their work. Deer, turkey, bear and many other wildlife species are flourishing in the face of decreasing habitat. Protection has been expanded to cover shore birds and nongame wildlife species. Many who have traded and profited in illegal wildlife sales have been arrested and put out of business. And deaths from hunting and boating accidents have steadily declined.

The wildlife enforcement officer is in the watchdog role over the wildlife resources of the state. All the regulations and game management plans will be to no avail if someone is not there to enforce them fairly and impartially. But we try to accomplish these goals by realizing that people take to the woods and water to relieve stress, to enjoy the outdoors, to strengthen fellowship and family ties, and generally to have fun. The next time a wildlife enforcement officer inspects your boat or checks your hunting or fishing license and he or she tells you, "Thank you. Have a nice day," you can bet that officer means it. ☒

Sgt. K. F. Templeton ◆ *Area Sergeant, District 6*



MELISSA McGAW

My primary responsibilities as an area sergeant include supervising the wildlife law enforcement operations carried out by four wildlife officers located in Cabarrus, Davidson and Rowan counties. Our main goal is to enforce the game, fish and boating laws of the state as established by the General Assembly.

What I like best about the job is that it changes from season to season. In the spring, I'm working on fishing activities; in the summer, it switches to boating activities; and in the fall it's hunting. I like being able to assist citizens concerned about wildlife, whether it's a question about a regulation or a complaint about night deer hunting.

Game law violators are constantly discovering innovative ways to take wildlife illegally. Thus one of my toughest challenges is to explore new ways to combat this problem and to be more effective as a law enforcement professional.

ENFORCEMENT SUMMARY—1995			
Activity	No. Checked	Citations	Warnings
Hunting	62,166	4,702	382
Fishing	49,561	7,774	3,564
Boating	78,882	3,266	8,738
TOTAL	**190,609**	**15,742**	**12,684**

ENFORCEMENT SUMMARY—1996			
Activity	No. Checked	Citations	Warnings
Hunting	74,522	7,246	361
Fishing	156,646	7,295	2,622
Boating	87,941	3,554	9,510
TOTAL	**319,109**	**18,095**	**12,493**

Wildlife Management

In the 50 years since the N.C. Wildlife Resources Commission was established, this division's role has changed dramatically. The first wildlife biologists hired by the division were given the task of inventorying the state's wildlife. This was soon followed with big-game restoration programs and a three-point small-game habitat program.

At the end of this half century we are reaping the successes of the restoration programs and are now spending our time developing harvest programs to help manage our expanding big-game resources. Our small-game efforts have met with much less success, but we see hope for these species with recent changes in agricultural programs.

Managing game species such as white-tailed deer and gray squirrel once was this division's sole responsibility, but today that charge has expanded to embrace nongame wildlife species.

N.C. WILDLIFE RESOURCES COMMISSION

Our charge from the legislature has always been to manage all the state's wildlife resources. For years, sportsmen footed the entire bill for these efforts. Only recently have we begun to get funding from other sources, like the nongame tax checkoff to help support our efforts with nonhunted wildlife populations. Now, at the end of a half century of work, we are looking toward the future. If the "Teaming with Wildlife" bill to be introduced by the next Congress passes, we could see new funding similar to that which resulted in the formation of the Wildlife Commission 50 years ago. We are optimistic that the next half century can produce for nonhunted species the kind of financial support we have had for game species for the last 50 years.

Now, however, it is time to review our accomplishments for the last two years.

◆ Small Game

In April 1996, the U.S. Congress passed a farm bill that elevates wildlife resources to an equal level with soil and water resources and places many responsibilities for developing program guidelines with local committees in individual counties. Our biologists were actively involved with the Southeast Quail Study Group, which promoted many positive aspects of the farm bill legislation that Congress passed. However, the work is not completed.

Because of the impact that local committees will have on practices within each county, our agency has worked closely with the Natural Resources Conservation Service and the Farm Services Agency to recommend the adoption of programs that will benefit bobwhites and associated grassland/shrub land birds and mammals. Biologists from both the Research and Management sections developed a 62-page booklet with specific recommendations for all appropriate farm bill programs. This booklet was distributed to state and federal agricultural agencies, the North Carolina Forest Service, Cooperative Extension, and other interested agencies. We also have a seat on the State Technical Committee, which will review local farm bill recommendations. No single program in the last 50 years has had as much potential for small-game and associated species in the Southeast as the current farm bill.

We have expanded our cooperative program with North Carolina State University in the form of a new research project designed to test the effects of predation and habitat on quail and associated bird species. Our cooperatively designed scientific scheme will evaluate the effects of predator removal with and without habitat improvement, the effects of habitat improvement alone, and the response of birds on control areas where no manipulations will be made. We have committed one full-time wildlife biologist to direct predator removal and surveys and to supervise eight temporary technicians who will work on the predator study.

◆ Migratory Birds

Continental duck populations continued to improve during the biennium, following the prolonged drought that ravaged prairie breeding areas during the previous decade. Ninety million ducks were estimated in the 1996 fall flight originating in the surveyed areas. Numbers of ducks wintering in North Carolina likewise showed improvement, as did the number of hunters buying federal duck stamps in the state. Species showing the most notable improvement were gadwall,

***Small-game** project leader Terry Sharpe (right) works on a cooperative aerial seeding project with Quail Unlimited. The seed is dropped onto cutover forest lands to create food and cover materials for small-game species.*

KEN TAYLOR

shoveler, blue-winged teal, green-winged teal and canvasback. Habitat conditions for wood ducks breeding in North Carolina appeared to remain favorable. These improvements in duck numbers resulted in reinstitution of 50-day hunting seasons with five-duck daily bag limits in the Atlantic Flyway.

Numbers of migrant Canada geese wintering in North Carolina showed modest improvement in 1996. The increase may have been due to closure of the hunting season in the Atlantic Flyway or to relatively severe winter conditions in northern states.

Resident Canada goose numbers continued to increase during the biennium, as evidenced by rising numbers of nuisance complaints from farmers, other land managers and homeowners. The September Canada goose season was expanded statewide in 1995 in order to take advantage of this resource and is currently available to hunters in 98 counties.

Winter counts of eastern-population tundra swans peaked during the last decade and have begun to decline slightly in recent years. To stabilize the population, waterfowl managers recommended reductions in hunting permits beginning in 1996. North Carolina is contracting the development of a population-

KEN TAYLOR

***Technician** Daniel Ray checks a duck blind constructed for handicapped hunters on the Spring Creek Impoundment at Goose Creek Game Land off N.C. 33. This blind is one of several projects benefiting Tar Heel sportsmen at Goose Creek.*

Wildlife Management

***In a cooperative** program in Duplin County, turkeys were released by Wildlife Commission biologists with help from National Wild Turkey Federation personnel and their children. The continuing growth of wild turkey populations in North Carolina is one of the Commission's major wildlife success stories.*

KEN TAYLOR

simulation model for eastern-population swans, which should serve as a guide for setting optimum harvest regulations in the future. In support of this model development, plans are being finalized to leg-band several thousand swans each winter in the Atlantic Flyway.

During the biennium, numerous MARSH (Matching Aid to Restore State's Habitat) projects were completed with cooperation between Ducks Unlimited and the Wildlife Commission.

The costs of all of these projects combined totaled $1,002,964.37. Ducks Unlimited provided $326,035.95, the Fish and Wildlife Service contributed $25,000 and the N.C. Natural Heritage and Recreation Trust Fund donated $178,000 in cost-share funding. The remaining $473,928.42 was paid from the Wildlife Commission's waterfowl fund, which consists of proceeds received from the sale of state waterfowl stamps and prints.

The waterfowl field-sanctuary program was continued during the biennium. This program was first initiated in 1988 to increase wintering populations of Canada geese and other waterfowl by enhancing their habitat and protecting them from disturbance. Approximately 5,500 acres, in six locations adjacent to major wintering areas, were leased and planted in corn and winter wheat.

KEN TAYLOR

◆ Wildlife Diseases

North Carolina continues to experience outbreaks of rabies in terrestrial wildlife populations since the first case was confirmed in 1991. During the biennium, 853 rabies cases were confirmed in 731 raccoons, 81 foxes, 38 skunks and 3 bobcats. These cases were located in 52 counties, whose locations indicate that we have

***Good small-game** management practices, especially for quail, include the planting of warm-season grasses. Here, Commission personnel are burning warm-season grasses on the 43,000-acre Butner-Falls of the Neuse Game Land.*

Terry Sharpe ◆ *Small Game Project Leader*

MELISSA McGAW

As small-game project leader, my challenge is to help landowners realize the multiple benefits that come from integrating quail and rabbit habitat into their farm and forest management. For example, planting native grasses provides high-quality cattle forage and also improves cover for small game. Managing for longleaf pine produces high-quality forest products as well as good quail habitat. And managing vegetation along ditchbanks will improve water quality and reduce soil loss while providing cover for wildlife using cropfields.

The part I enjoy most about my work is knowing that the early successional habitats and management practices which support quail and rabbits can also be vital to other interests, such as declining songbirds, rare plant communities, water quality, and forest and farm productivity. My work on improving quail and rabbit habitat has brought me into close cooperation with experts in such diverse fields as plant ecology, hydrology, forestry, animal science, soil science, crop science and land conservation.

experienced movement of this disease through North Carolina from both the north and south. The maps shown below illustrate the progression of the disease since 1990. The impact of this disease outbreak on wildlife populations in North Carolina is not known, but other states to our north have documented dramatic declines in raccoon populations following the spread of the mid-Atlantic rabies outbreak. The rabies outbreaks are expected to continue and spread throughout the state during the next few years.

◆ Furbearers

North Carolina coyote populations are increasing in size and distribution because of immigration, reproduction and intentional illegal releases or escapes. Coyotes had been documented in 62 North Carolina counties at the end of the biennium. Coyotes continue to show up in unlikely areas because of natural dispersal or immigration. It appears that illegal importation or movement of coyotes into North Carolina continues.

The initial stocking phase of the Commission's river otter restoration project was completed during the biennium. The table below lists the streams, counties and number of otters by sex released since 1990. Stream surveys, reported observations and recovered road-killed otters indicate that the restoration effort is having the desired effect of reestablishing this native furbearer in areas where it had been absent for nearly 100 years.

◆ Big Game

Big-game populations remain at high levels in response to harvest and other management activities during the biennium. With a statewide population estimated at 1 million animals, white-tailed deer continue to be the most popular choice for hunters in the state. Our statewide mail survey of deer hunters indicated that 2.6 million trips were made to harvest 216,000 deer during the 1995-96 hunting season. The biggest increases in deer numbers and harvest occurred in the Piedmont and Mountain regions. Continued liberalization of either-sex seasons has increased doe harvests in all regions, with many counties showing some signs of stabilization of deer numbers. Urban deer problems increased over the period, and management schemes to limit deer complaints in these settings will challenge our personnel in future years.

The state's wild turkey program made significant progress during the biennium. The wild turkey population is now estimated at approximately 85,000 birds, occupying at least 98 of the state's 100 counties. Much progress was made in wild turkey restoration during the biennium. A total of 889 wild turkeys was released on 62 different restoration sites across the state. Division of Wildlife Management employees live-trapped and relocated 402 birds in-state and acquired an additional 487 birds from other states to supplement these efforts. The improving status of the wild turkey is being monitored, in part, by the mandatory tagging and reporting of hunter-harvested spring gobblers. Record harvests have been reported annually during the last decade. The average annual increase during this period has been 20 percent, and all three regions have shown increases in the reported harvest. Both population levels and reported harvests are expected to continue their upward trend during the next biennium.

Black bear populations in both the Coastal Plain and Mountains continue to expand in numbers and distribution. Occupied bear range has increased by 74 percent from 1981 to 1991, and bears now occupy 8.8 million acres in North Carolina. Bear harvests and bait index results in both regions have reflected these increased population trends and remained

Wildlife Management

JACK DERMID/N.C. WILDLIFE RESOURCES COMMISSION

***Access to a** hunting spot has been the sportsman's perennial demand. The agency's game land program provides over 2 million acres of land for hunting.*

stable over the biennium. Nuisance complaints concerning bears have also risen during the last five years, as both bear and human populations have increased in areas that bears occupy. Biologists developed a brochure on dealing with bear problems in residential areas to provide technical guidance to people about living in bear country. The proper handling of bear-human conflicts represents a great challenge to managing bears over the short term.

Three major research projects on coastal bears continued or were completed during the last two years. Researchers at the University of Tennessee are conducting the research with Wildlife Commission personnel involved primarily with a study on the Neuse-Pamlico peninsula. Information on population dynamics, habitat use, productivity, and interaction with forest and farm practices will be used to better manage our coastal bears. Commission personnel continue to spend a great deal of time collecting data on our bear populations. *Wildlife in North Carolina* published a

two-part series (January and February 1996) describing the Commission's black bear monitoring system and the status of bears in North Carolina.

Coastal Region

On Goose Creek Game Land, several enhancement projects have been completed to benefit Tar Heel sportsmen. Electric pump units have been installed on the Hobucken and Spring Creek/Hunting Creek impoundments. Installation of these pumps will improve water management on these sites. Sportsmen have also benefited from a newly constructed footbridge linking Spring Creek and Hunting Creek impoundments. This project provides additional opportunity for "walk-in" waterfowlers. To provide disabled sportsmen a location to waterfowl hunt, a specially designed blind has been erected on Spring Creek impoundment.

An aggressive prescribed-burning program has continued on Coastal region game lands. Over the past two years, section staff have burned over 4,244 acres to improve habitat conditions for game and endangered species, timber growth, and wildfire control. Several hundred acres have been burned during the growing season to improve habitat conditions for red-cockaded woodpeckers and several rare or endangered plants.

During the past two years, 337 acres of timber have been thinned on Goose Creek Game Land, along with an additional 45 acres being marked for future harvest. Emphasis has been placed on improving timber stands for wildlife and timber production.

A cooperative project between the Carteret County chapter of Quail Unlimited, the U. S. Forest Service and the Wildlife Commission was initiated on Croatan National Forest to manage approximately 5,000 acres for bobwhite quail. Through funding provided by Quail Unlimited, the Commission and the Forest Service have been able to conduct habitat improvement projects to benefit quail. Approximately 38 acres in field borders, 7 acres in screens, and 3 acres in brush piles were established adjacent to agricultural production areas. In addition, the Forest Service has burned over 1,000 acres of the project area. To monitor the project, the Carteret County chapter, in cooperation with the Wildlife Commission, has conducted call-and-flush count surveys on the area for the last two years.

Central Region

In the central region, biologists, foresters and technicians manage 18 game lands that total 262,600 acres of leased and state-owned lands. On these areas they posted 829 miles of boundary lines and maintained 494 miles of hunter-access roads and eight hunter campgrounds. To improve habitat, personnel and co-op farmers planted 3,928 acres of wildlife food and cover plots, top-dressed 546 acres of perennial food/cover plots, and mowed 693 acres of wildlife openings. On the major game lands, 32,253 acres were control-burned to improve habitat for game and nongame species. Of this total, nearly 8,000 acres were burned during the growing season at Sandhills Game Land to improve habitat conditions in red-cockaded woodpecker colonies. Seven greentree waterfowl impoundments were operated on the Jordan Game Land by managing for optimum shallow flooding of bottomland hardwoods. Hunter surveys on these impoundments indicate an average harvest of one duck per two hunters.

Thanks to cooperation from Carolina Power and Light, over 20,000 acres were added to the game lands program. The Shearon Harris Game Land was increased by 8,000 acres, including some prime deer and small-game habitat. The new 12,500-acre Pee Dee River Game Land, in Anson, Montgomery, Richmond and Stanly counties, offers outstanding opportunity for deer, turkey, small game and waterfowl. CP&L is also funding wildlife habitat improvements on these areas.

Western Region

During the biennium, western region project personnel have been enhancing wildlife habitat and improving opportunities for public hunting and fishing. Nineteen game lands were maintained with a total of over 1.1 million acres included in the game lands program. Over 6,000 acres were purchased to be included in the Green River Game Land in Polk and Henderson counties. Additional tracts were also purchased to improve access to Three Top Mountain Game Land in Ashe County. As leased lands have become more difficult to retain in the game lands program because of competitive leasing by the private sector, land acquisition has been given a high priority in the region.

Annual activities of Wildlife Management crews included pruning and releasing 5,000 fruit trees, maintaining approximately 2,600 acres of wildlife openings by mowing and/or fertilizing, treating 375 acres by prescribed burning, and posting and refurbishing 260 miles of boundary. New boundary development included surveying and posting 11 miles at Three Top Mountain and 15 miles at Green River

Wildlife Management

KEN TAYLOR

In the *Nantahala National Forest, Commission nongame biologist Chris McGrath works with contractors to introduce fledgling peregrine falcons to their mountain habitats. During the "hacking" project, the workers stay with the birds for six to eight weeks, observing and documenting their progress.*

Game Land. Access roads were maintained on state-owned game lands. Forestry activities on state-owned game lands included thinning projects, salvage sales and reforestation projects. Western Region game lands also include almost 250,000 acres being managed as bear sanctuaries.

Biologists, foresters and technicians coordinated with all Forest Service ranger districts in an effort to enhance wildlife habitat and to increase opportunities for sportsmen.

The Hunting Creek Swamp Waterfowl Refuge was managed as a resting area for migrating waterfowl and as a nesting area for wood ducks. Eighty wood duck nest boxes are being maintained on the area. This area was dedicated as a MARSH project during the biennium.

◆ Nongame and Endangered Wildlife

Conservation of rare aquatic species' habitats has been a high priority for the Nongame Program during the past two years. Although efforts to formally identify and conserve essential habitats were not successful, conservation is occurring in other ways. Biological, distributional and ecological data are regularly provided to local, state and federal agencies and citizens to better conserve aquatic habitats. These efforts are important considering the declines seen in some species' populations. Nongame biologists regularly monitor aquatic species' populations, and it appears that several mussel species' populations have declined significantly during the past few years.

North Carolina Partners in Flight continued efforts to address the decline of neotropical migratory birds. Notable achievements during the biennium included the development and publication of the management plan that outlines management and research needs for these birds. Funding for the project will come through the Fish and Wildlife Foundation provided that a required private funding match for at least $16,000 can be obtained.

During the biennium, emphasis on eagles continued to involve locating and monitoring breeding territories. Six new eagle nests were found during the past two years, bringing the total number of monitored nests in the state to 16. Although all these nests are not active in any one year, 25 eagles fledged from them during the period.

The Nongame and Endangered Wildlife Program administers the sea turtle program statewide. This includes coordination of turtle nest protection projects and maintaining the Sea Turtle Stranding and Salvage Network. During the biennium, 811 dead or injured sea turtles were reported from coastal waters in North Carolina. These reports were the result of efforts of a large number of cooperators including volunteers and personnel of other state, federal and nongovernmental agencies.

Biologists surveyed and managed colonial nesting waterbirds during the biennium. These species included terns, gulls, skimmers, herons, egrets, pelicans and ibises. With a cooperative agreement in place involving other agencies and organizations, we have been able to provide a concerted effort to protect these important resources. Seventeen Commission-owned nesting islands were posted against intrusion during the nesting seasons. In 1995 a complete survey of all coastal estuaries and barrier island beaches was conducted, and in 1996 a complete survey of all inland swamps and wetlands east of Interstate 95 was accomplished. This is the first time since 1976 that these inland sites have been

NORTH CAROLINA RIVER OTTER RESTORATION PROJECT STATUS

River	County	Male	Female	Total	Status
Catawba	Burke	19	10	29	Complete
Little Tennessee	Swain	24	10	34	Complete
French Broad	Buncombe	16	10	26	Complete
North Toe	Mitchell	10	10	20	Complete
South Fork New	Ashe	10	10	20	Complete
Broad	Rutherford	10	10	20	Complete
Yadkin	Wilkes	15	10	25	Complete
South Catawba	Catawba	18	10	28	Complete
North Fork Catawba	McDowell	12	10	22	Complete
Nottley	Cherokee	11	10	21	Complete
Hiwassee	Clay	12	10	22	Complete
PROJECT TOTALS		**157**	**110**	**267**	

REGIONAL BIG-GAME HARVESTS, 1995-1996

Species	Coast	Piedmont	Mountains	State
White-tailed Deer[a]	125,000	65,200	25,800	216,000
Wild Turkey[b]	282	960	1,317	2,559
Black Bear[b]	755	–	330	1,085
Wild Boar[b]	–	–	71	71

[a]Mail Survey Estimate

[b]Reported to Wildlife Cooperator Agents or by Telephone

WILD TURKEY RESTORATION, 1990-1996

Year	In-State Birds	NonResident Birds	Total Relocated
1990	161	92	253
1991	228	280	508
1992	185	128	313
1993	169	305	474
1994	212	237	449
1995	209	116	325
1996	193	371	564
TOTAL	**1,357**	**1,529**	**2,886**

OCCUPIED BLACK BEAR RANGE (Acres)

Year	Coast	Mountains	Total
1971	1,648,639	952,320	2,600,959
1981	3,771,660	1,292,160	5,063,820
1991	5,544,314	3,268,000	8,812,314

DEBBIE CONGER/N.C. WILDLIFE RESOURCES COMMISSION

***Over the past** two decades, the black bear range in North Carolina has quadrupled, with the population expanding in the Coastal Plain and the Mountains.*

surveyed, and 61 colonies containing over 5,600 nests were located and censused.

Research on diamondback terrapin density and distribution continued in the Jarrett Bay area of Carteret County. A total of 259 terrapins have been captured and individually marked in the study area.

The Nongame Program staff continued efforts toward peregrine falcon recovery in the southern Appalachians. Annual monitoring of peregrine nesting at cliff sites in western North Carolina revealed four nesting pairs in both 1995 and 1996. A total of 16 young falcons were fledged during the period from those nests. In addition, seven captive-bred young peregrines were released in Macon County in 1996, in a continued effort to establish new breeding pairs and a sustainable population in the region.

Other projects have involved Virginia big-eared bats, northern flying squirrels, and cerulean warblers. ⊠

Boating and Inland Fisheries

The role of the Division of Boating and Inland Fisheries has changed significantly over the past 50 years. When the N.C. Wildlife Resources Commission was first established in 1947, fisheries managers concentrated on stocking more fish. In the 1950s and 1960s, we conducted fisheries inventories and research on management techniques, and in the early 1970s, we shifted our program direction to implement the recommendations generated from the completed inventories.

In the late 1970s we realized that rapid population growth and subsequent land development were destroying valuable fisheries habitat, and we shifted our efforts toward protecting our remaining resources. In the early '80s, the Commission approved the "Guidelines for Conservation of Wetlands and Aquatic Habitats," which established guidelines to minimize impacts of development activities and protected aquatic habitats. The late '80s brought new change in our focus for managing wild trout populations and innovative improvements in our cold-water production program. In the '90s, the Commission is the lead agency in reviewing and evaluating development activities, and we provide proven recommendations that minimize adverse impacts to aquatic resources.

***Regulations** setting the length of fishing seasons and catch limits have been based on the Wildlife Commission's continuing research programs. Fisheries biologists have historically learned much about game-fish populations by such practices as sampling.*

N.C. WILDLIFE RESOURCES COMMISSION

We continue to monitor fish populations, improve fishery habitats, stock fish and work cooperatively with other state agencies. We also work with electric utility companies to protect our remaining aquatic resources while providing quality recreational fishing opportunities. Our accomplishments during the last biennium are summarized below.

◆ Habitat Consevation Program

North Carolina's population has increased at a very high rate, with continued rapid growth projected. While this population increase may be good news for the state's economy, it can be bad news for the state's fish and wildlife populations that depend on wetlands, riparian (streamside) corridors and large tracts of undisturbed forest.

State and federal laws charge the Wildlife Commission with protecting, managing and conserving aquatic, wetland and upland habitats in North Carolina for the benefit of fish and wildlife populations. Habitat Conservation Program staff work to meet these legal mandates by reviewing and making recommendations on permit applications and environmental documents for proposed development projects that could adversely affect fish and wildlife populations or their habitats.

During the biennium, staff biologists reviewed 3,995 proposed projects statewide and evaluated the potential environmental threats associated with each project. We recommended project design modifications to minimize adverse environmental impacts and also recommended mitigation to compensate for unavoidable impacts. Evaluations of the program's effectiveness at influencing permit conditions were completed in both 1994 and 1995. We were able to influence permit conditions 70 percent of the time in 1994. In 1995 our success rate increased to 80 percent.

During the biennium, biologists reviewed 366 highway improvement projects and in many cases recommended design modifications or alignment shifts to minimize impacts to wildlife and fishery habitats. Linear roadway projects often have multiple stream crossings and can affect many different habitat types. Habitat fragmentation is a major contributing factor in overall wildlife habitat degradation. This is especially true when roadways are built on new locations. Not only does the roadway cover valuable wildlife habitat, the roadway acts as a barrier to wildlife movements or results in mortalities as animals continue to access preferred feeding or resting areas by crossing the travel lanes.

Our staff biologists work closely with the N.C. Department of Transportation (DOT) to develop mitigation strategies to offset this loss of wildlife and fisheries habitat. We identify areas that should be preserved and help restore habitat on previously disturbed areas. In the Mountain region, one large highway project will cause as much as 10,000 feet of high-quality streams—either trout streams or tributaries to trout streams—to be placed in culverts. As mitigation for this loss of high-quality fishery habitat, the DOT has agreed to set up a restoration fund to be administered by the Wildlife Commission for restoration of approximately 25,000 linear feet of degraded streams.

We also work with the DOT on wetland mitigation projects. In the Coastal Plain, improvements

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

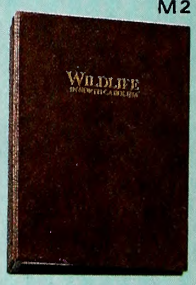
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

Wildlife in North Carolina Magazine

See our easy-order subscription form on back!

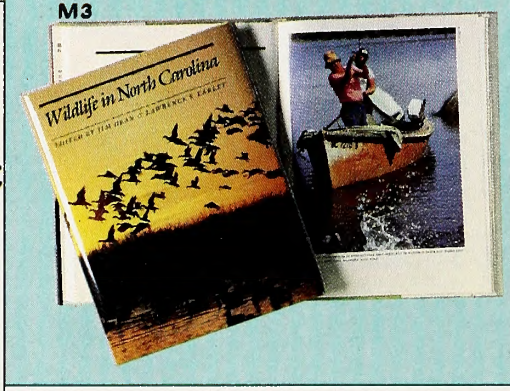
- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**

M2



- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**

M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

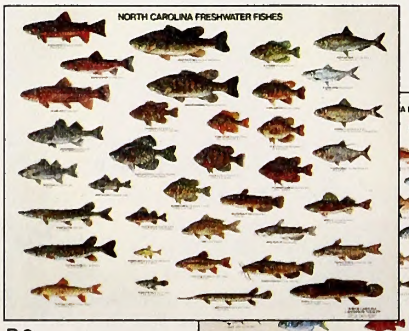
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

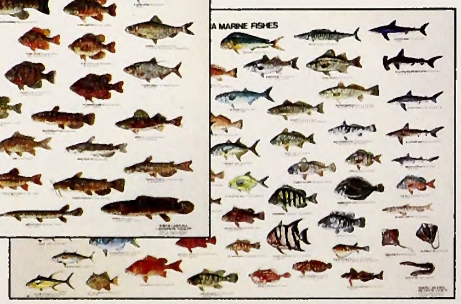
- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**



P6



P7

P3 P4 P5 P8

- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

Magazine Subscriptions

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____/_____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

Magazine Gift Subscriptions

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

____ Magazine/gift subscriptions **TOTAL**

Educational Materials

WS97

Name _____ Home phone (___ ___) ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____/_____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL**	$
Discount (subtract 15% discount for **retail** orders of $100 or more)	$
Sales tax *(N.C. residents add 6% sales tax)*	$
Educational materials **TOTAL**	$

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths. Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence
☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To **charge** your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires____/ _____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

♻ *Printed on recycled paper*

N.C. Wildlife Endowment Fund

KEN TAYLOR

Wildlife *Commission fisheries biologists and N.C. State University researchers push gravel into Jordan Lake in Raleigh. The research project is intended to produce habitat for young largemouth bass and increase the survival of the fish.*

are ongoing along almost every major federal highway. For example, improvements to U.S. 17 will affect approximately 1,100 acres of wetlands that not only provide high-quality wildlife and fish habitat, but also perform important water-quality functions. U.S. 17 crosses the Pasquotank, Perquimans, Chowan, Roanoke, Pamlico, Neuse, Trent, White Oak, New and Cape Fear rivers. With impacts of this magnitude it is easy to understand why DOT projects require a great deal of wetland mitigation.

◆ Research and Survey

Coastal Region

Research activities in the coastal region have concentrated primarily on striped bass, largemouth bass and other sunfishes. Striped bass surveys, while focusing on the major population of the Roanoke River-Albemarle Sound, have expanded to the Tar-Pamlico, Neuse and Cape Fear rivers. Stripers, or rockfish, are sampled during their spring spawning migrations up coastal rivers to determine age and sex composition and to develop an index of relative abundance. The Roanoke River population has greatly expanded in recent years as a result of improved spawning success and restrictive regulations on commercial and recreational harvest. As this population continues to recover, a popular catch-and-release fishery has developed in the Roanoke River after the harvest season has closed. To limit mortality of released fish, we examined factors responsible for mortality, including bait type, hooking location and water temperature, and made recommendations to anglers. We introduced regulations to reduce mortality of released fish.

Biologists conducted an extensive study of Sutton Lake near Wilmington in cooperation with Carolina Power & Light (CP&L) to determine fishing pressure and harvest rates of various species and to survey angler opinions. Anglers were interviewed on the lake several days per week, and harvested fish were examined. Survey data provided additional information needed to evaluate restrictive harvest regulations for largemouth bass. These regulations were enacted when sampling indicated relatively few large bass were present in the lake, indicating the possibility of overharvest. The management objective is to

Boating and Inland Fisheries

N.C. WILDLIFE RESOURCES COMMISSION

***On Lake Chatuge** in Clay County and more than 20 other large and small reservoirs each year, fisheries biologists sample largemouth bass and crappie populations. Population sampling helps biologists make good recommendations for managing fish.*

create a trophy bass fishery in Sutton Lake.

A two-year study on Currituck Sound began in 1996 to determine if supplemental stocking of largemouth bass will enhance localized populations. Bass abundance declined in Currituck Sound due to saltwater intrusion that affected the fish's reproduction. Approximately 7,000 largemouth bass fingerlings raised at Watha State Fish Hatchery were implanted with magnetic cheek tags during 1996 and stocked into three embayments of Currituck Sound. Survival and movement of stocked largemouth bass fingerlings at different salinity levels are being examined.

Piedmont Region

Reservoir fisheries are the center of public fishing opportunities in the Piedmont region of North Carolina. There are many large reservoirs for flood control and power production on the Catawba, Yadkin, Haw, Neuse and Roanoke rivers. Even more common are the smaller (usually less than 1,000 acres) city water-supply lakes scattered throughout the region that are open to public fishing. Because largemouth bass and crappie are the two most popular reservoir fisheries, most of the fish sampling conducted by fisheries biologists is directed at these species. Spring shoreline electrofishing is used to collect largemouth bass, and fall trap netting is used to collect crappie. Both types of sampling provide indications of fish abundance, growth, age, size and condition. Nearly 25 reservoirs were sampled each year of the biennium. Sampling results provided the scientific information needed to make

FISH PRODUCTION PROGRAM

Warm-Water Fishes Stocked

Species	Size	1995	1996	Total
Striped Bass	2"	1,183,788	552,804	1,736,592
	6"	126,354	39,500	165,854
Bodie Bass	2"	53,580	52,825	106,405
	5-7"	23,054	0	23,054
Largemouth Bass	1-5"	10,277	107,750	118,027
Redbreast Sunfish	2"	127,175	40,000	167,175
Bluegill Sunfish	2"	20,180	77,000	97,180
Redear Sunfish	2"	14,500	54,000	68,500
Hybrid Sunfish	4-6"	1,675	0	1,675
Channel Catfish	4-8"	36,199	77,750	113,949
	8-18"	57,299	107,600	164,899
Threadfin Shad	adult	120,400	0	120,400
TOTAL		**1,774,481**	**1,109,229**	**2,883,710**

Cool-Water Fishes Stocked

Species	1995	1996	Total
Walleye	62,943	71,529	134,472
Muskellunge	788	0	788
Smallmouth Bass	8,400	24,610	33,010
TOTAL	**72,131**	**96,139**	**168,270**

Cold-Water Fishes Stocked (Catchable Trout)

Species	1995	1996	Total
Brook	179,738	180,487	360,225
Brown	110,033	111,717	221,750
Rainbow	254,794	274,085	528,879
TOTAL	**544,565**	**566,289**	**1,110,854**

Cold-Water Fishes Stocked (Fingerling Trout)

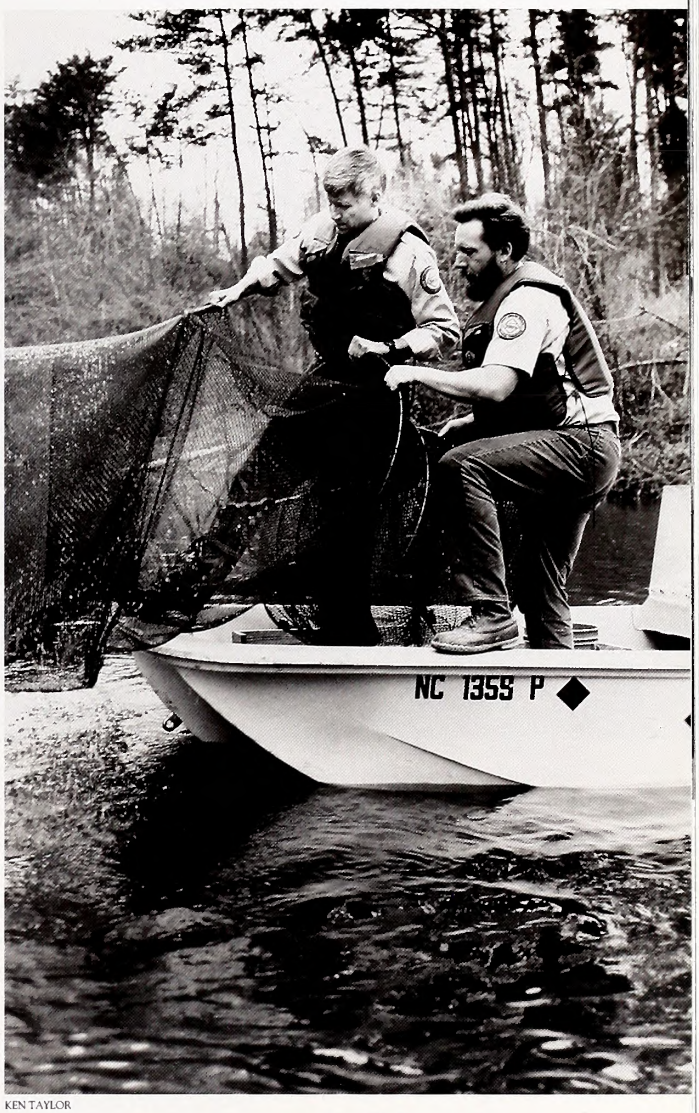
Species	1995	1996	Total
Brook	0	3,000	3,000
Brown	29,377	50,110	79,487
Rainbow	500	17,000	17,500
TOTAL	**29,877**	**70,110**	**99,987**

good fisheries management recommendations.

The Wildlife Commission stocks striped bass in most of the region's larger reservoirs and in some eastern rivers. Our biologists are cooperating with Duke Power Company biologists at Lake Norman to determine if the lake's shad population can support a recent increase in the striped bass stocking rate. Striped bass growth rates and "fatness" were measured the last two winters to see if the fish are getting the food they need to grow and be healthy. Lake Norman striped bass are thin in the fall following very warm summers. We are continuing the study to separate the effects of warm weather from shad availability on striper condition.

Striped bass in the Roanoke River are well on their way to a recovery from population lows in the 1980s. Because of the success of striped bass in the Roanoke River, biologists have taken a closer look at striped bass populations in other coastal rivers. Regional biologists spent much of the past two springs evaluating the striped bass spawning run in the Tar River. We plan to use the results to make recommendations on striped bass stocking policy and size and creel limits in the Tar River.

Some of the division's research and survey work is accomplished by grants to university fisheries biologists. Researchers at North Carolina State University used the past two years to study the biology of small largemouth bass. They found that subadult bass travel little and probably don't move from areas of the lake where there are lots of bass to areas of the lake where there are few bass. They also are studying the impact of stocking very young bass into areas with few bass to see if they survive and contribute to the fishery. Finally, university biologists are continuing to look at the relationship between small bass survival and habitat manipulations. When the work is finished, we will better understand if management of small bass can produce changes in populations of large bass.



KEN TAYLOR

Wildlife Commission fisheries biologists Joe Mickey (left) and David Yow (right) employ a trap net in Kerr Scott Reservoir in Wilkes County to capture black crappie.

Mountain Region

The Mountain region, known best by anglers for cold-water trout fishing, continued several research and survey activities emphasizing better trout fishing opportunities and protection of trout resources. A significant activity has been the expansion of delayed-

Boating and Inland Fisheries

KEN TAYLOR

***Wildlife** Commission boating technicians pour concrete for a boat ramp at Lilly's Bridge on Lake Tillery in Montgomery County. The Commission maintains 168 boating access areas throughout the state.*

harvest waters . This regulation, first implemented during the 1992 fishing season, gives anglers the best of both worlds, a season to catch and release stocked fish and a season to harvest them. The regulation emphasizes higher-than-average catch rates by recycling trout through multiple captures. In 1992, the program consisted of only four streams and the catch-and-release season was three months long. During this biennium the program was expanded to include 10 waters and, beginning in October 1996, the catch-and-release period was expanded to eight months. This has proven to be the most popular trout regulation introduced in recent years.

The U.S. Forest Service, North Carolina Trout Unlimited, the Tennessee Valley Authority (TVA) and the Wildlife Commission continued to cooperate in identifying the distribution of brook trout throughout western North Carolina. Approximately 80 percent of the streams on public lands have been surveyed. This survey provides the basis for protecting brook trout populations and reestablishing brook trout in streams where they have been lost because of man-made or natural causes. In addition to the distribution surveys, we conducted genetic testing of 48 wild brook trout populations. Recent research indicates there may be a distinct southern Appalachian strain of brook trout that differs from those populations found farther north. If this holds true, then managers will use the southern strain when making brook trout reintroductions.

Fieldwork to evaluate the use and effects of natural bait in wild trout waters continued during the biennium. Efforts to develop trout fishing maps for anglers also took a big step forward this biennium when the Wildlife Commission earmarked $40,000 from the Wildlife Endowment Fund to computerize trout fishing regulation information. Lastly, during the last five years, we conducted annual fish population surveys on 17 wild trout streams to determine variations in the numbers and sizes of fish. Survey results will provide fishery managers with insight into the dynamics of North Carolina's wild trout populations and allow better management decisions to be made.

A warm-water fisheries research coordinator position was created in 1994 to increase the amount of research and survey activity on mountain reservoirs and rivers. Recent warm-water survey projects include an evaluation of black bass regulations on W. Kerr Scott Reservoir, an interagency initiative to manage fisheries on Chatuge Reservoir and cooperative survey efforts on Catawba River reservoirs owned by Duke Power Company.

In addition to reservoir studies, we are investigating ways to improve river fisheries. Ongoing studies involve formulation of management strategies for the muskellunge fishery in the French Broad River and establishment of a smallmouth bass fishery in the Catawba River between Lake James and Lake Rhodhiss. Our biologists continue to develop partnerships with TVA, power companies and other reservoir operators, as well as with interested angling groups, to meet the challenge of managing warmwater fisheries in western North Carolina.

◆ Fisheries Management Program

Division technicians constructed two handicapped-accessible public fishing piers in the coastal region during the biennium. The piers are located on the Roanoke Sound near Manteo in Dare County and at Lake Rim near Fayetteville in Cumberland County. These areas also offer handicapped parking. A total of nine public fishing areas are now available in the region.

In the Piedmont, Blewett Falls Public Fishing Area was constructed in 1995. Located on the Pee Dee River on the boundaries of Anson and Richmond counties, this newest public fishing area (PFA) was a cooperative effort between CP&L and the Wildlife Commission to increase public fishing

access to the Blewett Falls tailrace.

The 8-foot-wide concrete fishing platform stretches 242 feet along the downstream face of CP&L's Blewett Falls powerhouse. Paved and lighted parking for 49 vehicles includes seven designated handicapped spaces, including two spaces accessible to vans. A gently sloping paved trail with handrails leads from the parking lot to the fishing platform, making the site completely accessible to persons with disabilities. During the spring months, anglers can fish for American shad and striped bass that ascend the Pee Dee on their spawning runs and concentrate in the Blewett Falls tailrace. Year-round resident fish include white bass, white perch, crappie, other sunfishes and various catfishes.

Additional access improvements to other PFAs included installation of shoreline fishing benches at Upper Barton (Falls of the Neuse Lake) and Lilly's Bridge (Tillery Lake). A handicapped-accessible fishing pier and parking area were constructed at Rabbit Shuffle Pond on Caswell Game Lands. To learn more about Blewett Falls, Rabbit Shuffle and other Commission public fishing sites, contact the Division of Boating and Inland Fisheries at (919) 733-3633 and request a copy of *Public Fishing Access Areas and Community Fishing Program Sites in North Carolina.* Updated in 1996, this brochure describes each site's location, types of fisheries and facilities available.

Brush, Christmas trees or PVC structures were emplaced to create new fish attractors or added to existing attractor sites at Tillery, Norman, and Falls of the Neuse reservoirs and at Rabbit Shuffle Pond. Shoreline hardwood trees were also cut, hinged and cabled at Cane Creek, High Rock, Jordan, Tillery and Tuckertown lakes. Fish-attractor buoys were installed or maintained at all attractor sites.

The Community Fishing Program (CFP) added five new parks and recreation departments as cooperators over the last two years. Thirteen cooperators are now participating, and intensive fisheries management activities are occurring at 18 ponds and lakes. This highly successful program improves fishing opportunities in urban areas by bringing fishing to the people. Program expenses are cost-shared with the parks and recreation departments (25 percent) and the Wildlife Commission (75 percent), which administers the program.

In the past two years, we have stocked over 137,000 channel catfish ranging in size from 8 to 14 inches at CFP sites. Fish are usually stocked monthly (from April through September). Solar-powered fish feeders are used to dispense feed to the catfish several times daily.

Additional management activities conducted at CFP sites include removal of brush from bank fishing areas, installation of fish attractors, control of aquatic weeds, maintenance of bait around piers and bank fishing areas to attract fish, and construction of fishing piers.

A Fishing Tackle Loaner Program was begun during the biennium. This program loans rods and reels to youngsters and adults in a manner similar to checking out a book from a library. Each participant receives an identification card, and, after the first loan, youths under 16 receive a free tackle box. This program, in conjunction with instructional clinics at CFP sites, will provide participants with the "how to" of fishing and the means by which to fish. This approach should cultivate angler interest and long-term participation in fishing.

You can be a volunteer instructor, or find out more about the location of Community Fishing Program sites by calling the Division of Boating and Inland Fisheries at (919) 733-3633 or by writing to the N.C. Wildlife Resources Commission, 512 North Salisbury Street, Raleigh, N.C. 27604-1188.

Gordon S. Myers ◆ *Conservation Engineer*

MELISSA McGAW

As Conservation Engineer, I provide a variety of engineering services to the agency. My primary responsibility is to design boating and fishing access facilities. In addition, I coordinate architectural and engineering services for capital improvement projects.

I particularly enjoy the direct design-and-build opportunities that this job affords. Because the majority of the facilities are constructed or renovated by Commission personnel, I have been able to gain critical hands-on experience that facilitates future design improvements. In addition, I learn a lot from the direct interaction with the field staff who possess valuable construction skills and techniques.

I also enjoy the challenge of developing designs that enhance recreational resource opportunities and employ environmentally conscious design solutions. Another engineering challenge is to incorporate barrier-free accessibility into each design. All new facilities, as well as existing facilities that undergo major renovation, are designed to be accessible for persons with disabilities. I am very pleased with the progress we have made. In 1995, we were recognized by the Carteret County Mayor's Committee for Persons with Disabilities for our efforts toward achieving accessibility at the Morehead City boating access facility.

Boating and Inland Fisheries

KEN TAYLOR

***Fisheries** biologist Bob Curry enjoys helping young anglers at Shelley Lake in Raleigh, the first of the division's Community Fishing Program sites.*

◆ Fish Production Program

Warm-Water Production

Warm-water fishes are stocked throughout the state to enhance angling opportunities when a species cannot reproduce under given conditions, such as when striped bass stocked in reservoirs cannot make spawning runs upstream, or when productivity of the water is limited. Stocking is also used to restore fisheries when stocks have been seriously depleted by fish kills or other events. Watha State Fish Hatchery, located in Pender County near Burgaw, produces striped bass, Bodie bass (striped bass hybrids), channel catfish, largemouth bass and sunfish. Striped bass from the Watha State Fish Hatchery are stocked into numerous reservoirs, as well as coastal rivers, such as the Neuse and Tar-Pamlico, to help restore populations that have declined in recent years. Channel catfish are produced for CFP lakes to provide fishing opportunities near urban areas.

Mountain Region

The management of stocked trout in hatchery-supported trout waters is a major component of the region's Trout Management Plan. Our hatchery programs include a diverse catchable-trout stocking program, fingerling trout stocking in areas of limited natural reproduction and the capability for conservation stocking, which includes propagation and relocation of special fish stocks such as native brook trout. During the biennium, the Wildlife Commission's three trout hatcheries stocked over 1.4 million trout in 1,000 miles of streams and 1,100 acres of lakes and ponds open to public fishing. We also added streams to the delayed-harvest program, which provides catch-and-release fishing in hatchery-supported trout waters for a portion of the season. Additional variety was provided by stocking 4 percent of the requested number of trout as large fish, averaging over 14 inches in length.

The propagation of cool-water fishes is also an important component of fisheries management in the Mountain region. We stocked over 300,000 juvenile walleye during the biennium to supplement walleye populations in mountain reservoirs. Fingerling muskellunge averaging 14 inches in length were stocked each fall to supplement naturally reproducing populations. Smallmouth bass fingerlings were stocked to offset limited reproduction in areas of poor habitat conditions.

In recent years hatchery operations have focused on enhancing the quality of fish stocked. The average size of trout stocked has increased by 20 percent over the 1986 size. New techniques in egg incubation and fingerling feeding and improved techniques for maintaining the genetic integrity of brood stocks also have enhanced fish quality. We are making strides toward matching the genetic characteristics of bass brood stocks with the genetics of historical fish populations from the waters being stocked. A successful captive brood stock program for walleye has significantly reduced the labor required to produce that species.

KEN TAYLOR

KEN TAYLOR

***Fish technician** Derek Boggs rounds up brown trout brood stock at Armstrong Fish Hatchery near Marion in McDowell County. These fish produce eggs for the fish hatchery. At right, a large hatching jar contains over 80,000 eggs that will form the next generation of hatchery-bred trout released in mountain streams.*

◆ Technical Guidance Program

Division fishery biologists provided free technical assistance to a total of 1,151 pond owners during the biennium. Assistance included the investigation of problems concerning population dynamics, disease, fish kills and vegetation control. Biologists also reclaimed ponds as requested and made recommendations on triploid grass carp stockings, game fish stocking rates and general pond management. Pond owners were also advised about commercial hatcheries where fish could be purchased to stock their ponds.

Sixty-three fish kills were investigated statewide during the biennium. The Commission investigates the extent of fish kills and assesses total fish mortality.

◆ Boating Facilities Program

The Commission's boating personnel maintained 168 boating access areas throughout the state during the biennium. Routine maintenance ensures that all access areas are in the best possible condition during the peak boating season, from March through September.

During the winter months, each maintenance crew was involved in various projects to improve, expand or completely renovate existing access areas. These projects included replacing or adding docks and ramps, expanding parking areas and entrance roads, and completely redesigning and rebuilding existing high-use areas. During the biennium 17 boating access areas across the state received major improvements.

Designs for several new boating access areas were completed during this biennium, with actual construction to begin in late 1996 or early 1997.

The Commission receives an annual allocation of Sport Fish Restoration Funds through the U.S. Fish and Wildlife Service for use in developing and maintaining boating access areas. These funds are generated annually through a marine fuel tax and from federal excise taxes on boating and fishing equipment. The Federal Aid Funding Program allows the Commission to continue making improvements to existing boating access areas each year.

Boating personnel are also responsible for maintaining over 1,000 navigational buoys on the state's public waterways. This program is carried out to ensure a safer boating experience.

All buoys are routinely inspected twice a year to make sure they are not damaged and are on the proper station. These inspections are usually completed in early spring and late fall of each year. During the biennium, there were many storms that required additional inspections to be completed on many of our public waters. Over 200 buoys were replaced during this report period because of major storms. This resulted in many additional man-hours of effort, compared to previous years.

We plan to construct new boating access areas and continue the routine maintenance of existing sites. Many existing areas need to be expanded, or various improvements need to be made, to meet the demands of the public. These projects can only be completed through continued support from the boating and fishing public. ⊠

Conservation Education

Good teachers don't just make their students learn, they also make their students want to learn. Students are more motivated to learn when they see the relevance of their subject matter. Learning how we all are interrelated parts of the natural world catches the attention of most students. When examples of the world around us are used, learning math, science, language arts and social studies can become fun. At the same time the students gain an appreciation of natural systems and resources as well as of the need to use these systems and resources wisely.

While this belief has guided the division's work for the past 50 years, it has become the rationale behind the division's increasing role in the education of North Carolina's teachers and through interactive programs and workshops, particularly N.C. WILD and N.C. CATCH. To reach educators and youth leaders, the division has continued its highly successful educator workshops coordinated through the state's public and private school systems, institutions of higher learning, technical schools and youth organizations.

The division's many publications support its programs and serve to educate the general public. Examples include the *N.C. WILD Education Sites Instructor's Guide* and related materials, the annual *North Carolina Wildlife Calendar*, *North Carolina WILD Places* book, and the award-winning monthly magazine, *Wildlife in North Carolina*, now in its 60th year. The success of the division's philosophy and direction can be measured by the international, national and state awards received by division programs and personnel during the biennium.

***The new** Pisgah Center for Wildlife Education, in Pisgah National Forest, provides educational experiences for mountain visitors and residents. Trout raceways and other indoor and outdoor exhibits will help visitors understand how mountain stream ecosystems function.*

KEN TAYLOR

◆ North Carolina WILD

North Carolina WILD has been the most comprehensive and popular of the division's conservation education programs during the past biennium.

The centerpiece for N.C. WILD is a series of two interdisciplinary, supplemental educator activity guides: WILD Elementary and Secondary and Aquatic WILD. The guides are produced by the International Project WILD program with which the division is affiliated. These activity guides contain over 150 hands-on wildlife and natural resources activities. Each activity describes learner objectives and methods, provides background information, identifies materials needed, outlines procedures, lists extensions and includes an evaluation. Educators or youth leaders choose the activities they wish to use with their class or group.

For teachers in the North Carolina Public School System, each activity is correlated to the North Carolina's competency-based curriculum. There is also a correlation available to Cub, Boy and Girl Scout advancement and project requirements. Educators and youth leaders have found the guides to be extremely popular with young people because they use wildlife as a hook to teach math, science, English, art, physical education, history and other subjects. Teachers receive one Continuing Education Unit credit for attending a 10-hour workshop.

To receive the free guides, educators or youth leaders must attend a 6- or 10-hour N.C. WILD Instructor Training Workshop. Workshops are facilitated by regional education specialists within the division and are offered free of charge statewide and year round. During the biennium, division educators conducted 326 workshops across North Carolina with 5,649 educators and youth leaders attending.

In 1995, the division launched N.C. WILD Education Sites, a new component to the N.C. WILD program. N.C. WILD Education Sites is an opportunity for schools, businesses and community organizations to form partnerships to develop or enhance wildlife habitat. Students and adults can be trained to assess habitat, solve problems and develop skills to benefit wildlife and nature. To become involved in N.C. WILD Education Sites, a school or organization must be selected through an application process. If selected, groups are required to participate in a basic N.C. WILD workshop and an intense 30-hour workshop before a site can become certified as a N.C. WILD Education Site. Nine sites were

N.C. WILDLIFE RESOURCES COMMISSION

***The Division** of Conservation Education continues the tradition of educational outreach pioneered by education specialist, Lunette Barber. In the 1950s, Barber worked with groups of school children to increase their knowledge of wildlife. Workshops run by the division's specialists today reach thousands of educators and youth leaders each year.*

completed or begun during the biennium.

Other highlights of the biennium include participation in the N.C. Science Fairs program, N.C. Teaching Fellows Enrichment Program activities, special workshops and events with scouts, workshops for youth with special needs, and educational partnerships with the North Carolina Office of Environmental Education. Major publications produced included *N.C. WILD Education Sites Teacher's Guide*, *N.C. WILD Journal* and related teaching materials, as well as new sets of N.C.WILD Profiles (now totaling 90 issues). The publications staff also continued to produce eight annual issues of the popular and award-winning *North Carolina WILD Notebook*, a class-participation primer on natural history, wildlife and the environment.

◆ North Carolina CATCH

During the biennium, the division continued its comprehensive aquatic education program North Carolina CATCH (Caring For Aquatics Through Conservation Habits). N.C. CATCH is an aquatic resources education program that provides workshop training to adults so that they can instruct youth ages 8 to 15 in understanding aquatic environments through learning activities, educational materials, aquatic field trips and fishing experiences.

The major components of N.C. CATCH include an instructor's guide, student handbook, posters, fish identification cards, fish mobiles, rod/reel loan information and a fisheries video. These materials—all produced in-house—emphasize conservation habits, outdoor ethics, fish and aquatic species information, water safety tips, and practical fishing skills. Middle school teachers, curriculum specialists, scout leaders, recreation therapists, park personnel, camp counselors, fishing and environmental club members, 4-H leaders, and other youth leaders will find these materials adaptable and appropriate. N.C. CATCH is interdisciplinary and can be used to meet many middle school competency goals and objectives as well as advancement and project requirements for Cub, Boy and Girl Scouts.

While N.C. CATCH targets the 12-year old in terms of reading level, program concepts and skills, it can be integrated into lessons and activities for youth from ages 8 through 15.

To receive the free materials, educators and youth leaders must attend a North Carolina CATCH Instructor Training Workshop. Workshops are

Conservation Education

facilitated by division regional education specialists, and are offered free of charge. Teachers receive one Certificate Renewal Unit credit for attending a 10-hour workshop. During the biennium, division field educators conducted 60 workshops across North Carolina with 1,423 educators and youth leaders attending. In 1995, N.C. CATCH received the Association for Conservation Information's first place award for North American wildlife and conservation education programs.

◆ Pisgah Center for Wildlife Education

Early in the biennium, the Division of Conservation Education began construction of the Pisgah Center for Wildlife Education, near Pisgah Forest. The purpose of the center is to provide an opportunity to interpret the Wildlife Commission and its programs to the public, to explain how wildlife is affected by humans and vice versa, and also to explain why natural resources need to be wisely

MELISSA McGAW

***The N.C. WILD** Store continues to offer high-quality and moderately priced educational materials. New products during the biennium include T-shirts and ball caps designed by Conservation Education staff. Here, sales and marketing coordinator Sherry Outlaw (left) and designer Kimberly Schott (right), review a cap design on the manufacturer's premises.*

managed. At the end of the biennium, the site had two outdoor exhibits, one that focuses on the rearing of trout in the raceways of the adjacent Pisgah Fish Hatchery, and the second that features a model N.C. WILD Education Site. Under development are additional outdoor exhibits, an outdoor classroom, an auditorium, a N.C. WILD Store gift shop, and public rest room facilities.

When completed, exhibits will follow the Center's theme, "Mountain Streams, Where Water and Life Begin." Included will be an outdoor interpretive exhibit that features a half-mile walkway loop following a mountain stream. An indoor exhibit, featuring touch-screen computers with information on North Carolina's ecosystems, will provide orientation. The outdoor exhibit will incorporate a stream, native plant and animal life, and trout-rearing raceways where visitors will encounter visual displays, audio messages, live presentations, interactive displays, demonstrations and hands-on activities at a series of learning stations.

The Center is currently open to the public daily, March through November from 8:00 a.m. to 5:00 p.m., and from 1:00 p.m. to 5:00 p.m. on Sundays.

◆ N.C. WILD Store

Demand for educational publications, posters and videos from the N.C. WILD Store catalog nearly doubled between the 1994-95 fiscal year and the 1995-96 fiscal year. The development of T-shirts and ball caps to promote *Wildlife in North Carolina* magazine and the N.C. WILD program was begun late during the biennium with hopes of brisk sales. Items in the N.C. WILD Store catalog are sold at a small profit with the revenue generated being used to provide continuing support for educational programs.

◆ Youth Hunting

As part of a program to provide young hunters with opportunities and instruction on hunting safety and ethics, the division held two deer hunting orientations and hunts for youths. Instruction at an orientation covers deer management, wildlife management techniques at the hunt site, gun and tree-stand safety, outdoor ethics, and orienteering using map, global positioning and compass. The youth hunting program is conducted through a cooperative effort with other agency divisions and Duke Power Company personnel.

◆ Wildlife in North Carolina Magazine

During the biennium, the agency's monthly magazine, *Wildlife in North Carolina*, was again named by the Association for Conservation Information as the best state and federal wildlife and natural resource magazine in the United States and Canada. This is the second time the magazine has captured top honors in recent years. In cooperation with The University of North Carolina Press, the division also selected 50 "Our Natural Heritage" columns from the more than 200 that

***Education** specialist Mike Campbell talks to students of Cape Fear Academy in Wilmington at the WILD education site near their school. The site was one of nine begun or completed during the biennium.*

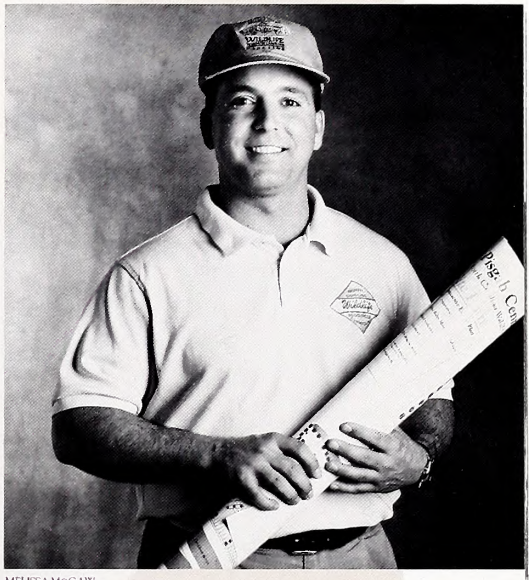
have appeared in the magazine and published them in a book released in the fall of 1995. Throughout the biennium, the magazine continued to offer a mix of subject matter ranging from natural history, fishing, hunting, wildlife management, research, agency activities, environmental issues, and other related outdoor recreational topics keyed to our state.

◆ Other Services and Programs

Support for other division and agency programs included assistance with the preparation of hunting, fishing and trapping regulation publications, as well as the design, photography and editorial assistance for brochures, handouts, forms, posters and other similar agency publications. During the biennium a 15-minute promotional video on the N.C. CATCH program was completed and distributed to educators throughout the state.

The high quality of the division's photography continued to play a key role in the overall success and public acceptance of the division's many publications. The division's image files, both still and motion photography, continued to be used extensively by agency personnel and by a variety of outside departments and environmental organization. ⊠

J.P. McCann ◆ *Natural Science Curator*



MELISSA McGAW

As curator of the Pisgah Center for Wildlife Education, located in the Pisgah National Forest in Transylvania County, I'm excited about the future. The purpose of the new center is to provide an experience to its visitors that will instill an appreciation of North Carolina's wildlife resources. Its exhibits and programs will provide an opportunity to explain how human activities affect and are affected by wildlife and the natural environment, and why these resources need to be thoughtfully and scientifically managed.

Since the completion of the wildlife center building in 1994, a site master plan has been developed. The center currently has two outdoor exhibits, but in the summer of 1997 additional outdoor exhibits will focus on wildlife management, protection, fish culture and conservation education. These displays will present general scientific concepts, illustrated through specific examples in the ecosystems of the Blue Ridge Mountains.

By choosing a career in resource conservation and education, I'm fulfilling my professional goal of contributing to a better place for us to live. The ongoing challenge at Pisgah is to provide visitors with an experience that will help them make informed decisions about wildlife.

KEN TAYLOR

Administrative Services

The Division of Administrative Services provides administrative and technical support to the Wildlife Resources Commission in the areas of accounting, purchasing, accounts payable, accounts receivable, data processing and customer support. The division is growing and improving the services it provides to the Commission and the public as technology is used to make operations more efficient. The most recent change in the Division of Administrative Services is the combining of data processing, license, boat registration and titling, and direct sales into one organizational unit called Customer Support Services. This change in the structure of the division responds to the need for modernized information systems, improved efficiency and better customer satisfaction.

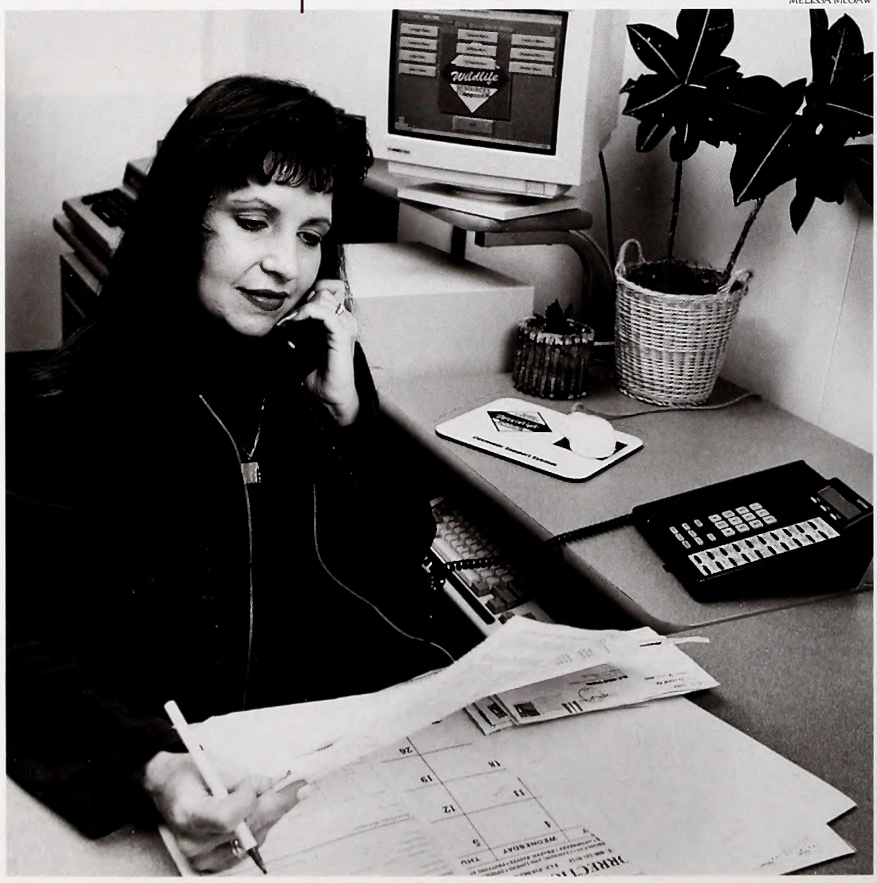
The Customer *Support Section's responsibilities include direct sales of sporting licenses, vessel registrations and titles, magazine subscriptions, calendars and educational products sold through the N.C. WILD Store. Circulation Manager Theresa Castro supervises direct sales at the Commission's Chapanoke Road office.*

◆ Financial Management

The finance unit, located in the Archdale Building, handles the accounting, budgeting, purchasing, stockroom and warehouse for the Wildlife Commission. On July 1, 1996, the Office of the State Controller implemented statewide the general ledger module of the new state accounting system. This system attempts to standardize the financial transactions and chart of accounts for all state agencies. To prepare for the transition to the new system, in-depth training was offered to the employees in finance and purchasing, as well as the administrative support and field employees.

The new system provides management on-line, real-time information and inquiry capabilities. This feature gives others in the Wildlife Commission access to information that was not provided to them before. The change in the accounting system also enabled the division to examine how processes could be streamlined to better serve the agency. In the future, the Office of the State Controller will be implementing additional modules of the accounting system for purchasing and inventory. The past year was a learning experience for everyone in the Wildlife Commission. We are still learning, although we are confident that experience and knowledge on the system will provide better services.

MELISSA McGAW



◆ Customer Support Services

The Customer Support Services section was organized to accomplish several goals of the agency:

- to automate the sale of licenses and vessel transactions across the state through point-of-sale terminals;
- to centralize our information database for in-house and outside use and to meet federal and state requirements; and
- to streamline processes.

To accomplish these goals, the Wildlife Commission in January 1996 entered into a five-year contract with Electronic Data Systems (EDS) to design, develop and implement the necessary system.

Currently license agents across the state sell licenses and process some vessel transactions through a cumbersome manual bookkeeping system. Sales, inventories, fulfillment of licenses and revenues are all done manually. At the end of each month the agent sends to Raleigh an accounting of licenses sold and revenues collected. Then, at the end of the year, the inventory of licenses on hand is returned to Raleigh, to be counted against licenses sold during the year. This system opens the door for errors and inefficiency.

The advantage of Customer Support Services will be that licenses and registrations are printed at the point of sale, thus eliminating the printing, handling, shipping costs and delays associated with the distribution and return of licenses and registrations. Hunting

This early-morning *scene at a check-in station in western North Carolina was a familiar part of hunting at one time. The wildlife management areas preceded the game lands that exist today.*

N.C. WILDLIFE RESOURCES COMMISSION

Administrative Services

***Nancy Roberson,** seated, Jon Vecchio and other personnel in the System Development and Support Section provide the technical and programming support for the agency's computer network and computer applications. This section also prints and mails licenses and vessel registrations and titles.*

MELISSA McGAW

SUMMARY OF OPERATIONS

	1994-95	1995-96
Cash Balance Carried Forward from Preceding Year	5,260,063.05	9,141,321.13
Net Receipts for Year	38,398,266.26	40,030,044.34
Total Available Funds	43,658,329.31	49,171,365.47
Less Expenditures	34,517,008.18	37,477,175.66
Cash Balance June 30, 1995	9,141,321.13	
Cash Balance June 30, 1996	—	11,694,189.81

Expenditures—July 1, 1994-June 30, 1996

	1994-95	1995-96
Administration		
Administration, Policy	820,339.92	911,896.92
Administrative Services		
Financial Services	595,687.85	649,967.48
Revenue Management	627,742.56	661,383.39
Data Processing	1,027,899.08	1,532,210.99
Watercraft Titling	999,935.55	1,307,852.15
Enforcement		
Law Enforcement	12,516,340.91	13,750,012.41
Conservation Education	2,168,628.47	2,291,977.42
Inland Fisheries	3,895,988.44	4,229,908.24
Construction and Maintenance	1,397,909.92	1,529,452.00
Wildlife Management	6,219,647.80	6,967,762.01
Nongame and Endangered Species	476,228.68	536,432.40
Reserves and Transfers	3,770,659.00	3,108,638.25
Wildlife Fund-Receipts	.00	-318.00
TOTAL EXPENDITURES	**34,517,008.18**	**37,477,175.66**

and fishing licenses and vessel registrations will be sold by agents using a computer and printer. The data from all transactions will be stored and forwarded to the central database overnight via telephone lines. Agents will be notified weekly of the amount of sales generated the previous week, in order to deposit those funds into their bank account. The Wildlife Commission will then be able to electronically transfer those funds to the state treasurer. Wildlife service agents will no longer have to report sales and remit funds through the mail, and the agency will receive its operating funds in a more timely fashion. The benefits to the customer will be a faster, more reliable and more convenient system to purchase licenses and register boats.

The new system will yield Wildlife Commission data that was previously not available due to the lack of automation. Customer Support Services will be able to give us geographic and demographic data on hunters and fishermen and allow us to determine other characteristics of our constituents' hunting and fishing activities and success. This data will in turn help the Commission meet the needs of the state and federal agencies that require information, as well as help us manage our programs.

Fulfilling license and vessel registrations creates an enormous amount of paperwork that this new automated system will reduce. The workload is especially heavy during the hunting and fishing seasons and is also heavy during the summer months for boater registration and renewals. Tracking information through the current system is a tedious, manual process. The use of toll-free numbers such as 1-800-NC-VESSEL and 1-888-2HUNTFISH enables individuals to purchase hunting or fishing licenses or renew boat registrations by phone and charge the cost to their MasterCard or VISA credit card. As a result, the division has been able to cut down the amount of paperwork that has to be processed by the transaction management unit.

The Customer Support Section contains six units:

Help Desk—answers technical and program questions from agents, as well as questions from the public concerning hunting and fishing licenses.

Direct Sales—handles the sale of *Wildlife in North Carolina* magazine, the North Carolina Wildlife Calendar, and educational products such as books, posters, videos and teaching aids. In addition, the unit handles all telephone sales and counter sales, including license sales and vessel transactions.

Data Entry—provides support to all agency divisions and programs in the area of data keying.

Revenue Management—has responsibility for the collection of all revenue for the agency and for depositing funds with the state treasurer.

Transaction Management—processes all mail received for hunting and fishing licenses and boat registration and titling transactions.

System Development and Support—provides the technical and programming support for the agency's computer network and computer applications. In addition, the unit prints and mails licenses and vessel registrations and titles processed by the other units.

The Customer Support System will be fully operational during the next biennium. It is a very exciting time for the Division of Administration, and we are looking forward to implementing the needed changes and improvements the system will accomplish. ⊠

Minnie Lois Poole ◆ *Purchasing Agent*

As the Wildlife Commission's purchasing agent, I'm responsible for providing administrative support to the agency's divisions and sections for their purchases of goods and services. I supervise the stockroom and warehouse activities, with the aid of an efficient team of personnel. I also make sure that the state's purchasing rules and regulations are met.

It's a challenging job because I have to satisfy two needs: the division's need for a particular item or service, and the agency's and ultimately the state's need for cost effectiveness. The best solution is one that is met at a savings to the agency and the state.

MELISSA McGAW

ENDOWMENT FUND

	Interest	Principal
1994-95	2,486,306.72	1,281,859.61
1995-96	2,759,055.59	1,155,417.87
TOTAL INTEREST AND PRINCIPAL	**5,245,362.31**	**2,437,277.48**

REVENUES—July 1, 1994-June 30, 1996

	1994-95	1995-96
Hunting and Fishing Licenses	14,505,044.02	14,902,519.97
Motorboat Registration	2,122,607.10	2,658,575.52
Watercraft Titling	186,233.00	312,588.00
Federal Cooperation	5,525,403.63	6,113,583.98
Management Area Receipts	4,025.00	3,585.00
Gasoline Fuel Tax	954,442.00	981,001.00
Transfer from Dept. of Revenue—Nongame Tax Checkoff	306,238.63	368,129.02
Transfer from Dept. of Revenue—Sales Tax	5,759,177.32	6,561,649.44
Transfer from Dept. of Justice—SBI	19,349.40	130,488.08
Transfer from Endowment Fund	2,434,121.00	1,389,437.00
Transfer from DEHNR	4,203,930.00	3,517,696.00
Transfer from Dept. of Transportation	104,438.33	80,100.00
Other Sales	254,313.80	223,604.68
Book Royalty—*Wildlife in North Carolina*	140.14	.00
Sale of Publications	375,836.75	367,773.28
Sale of Surplus Property	190,096.89	82,294.73
Sale of Listings	32,825.56	35,409.80
Sale of Timber Products	644,112.39	1,121,896.63
Fees, Licenses and Fines	56,673.00	57,483.90
Replacement Costs of Wildlife Resources	37,608.34	51,351.96
Rental of State Property	1,515.90	727.50
Private Donations and Gifts	99,806.13	308,346.03
Beaver Damage Pilot Project	44,000.00	80,000.00
Private Grant—Predation Research	.00	9,240.00
Local Funds—Community Fishing Program	11,258.05	16,741.20
Interest Income—Short Term	385,470.37	610,135.37
Miscellaneous	139,599.51	45,686.25
TOTAL REVENUES	**38,398,266.26**	**40,030,044.34**

Personnel Section

The Personnel Section is responsible for processing all employee-related personnel actions in the Wildlife Resources Commission and maintaining applications for job candidates. Employees are encouraged to contact the Personnel Office whenever they have concerns about personnel matters.

Personnel technician Mindy Calloway (right) helps new employee Monica Sharma fill out necessary forms during her Wildlife Commission orientation.

MELISSA McGAW

◆ Policies

The agency is governed by policies and procedures that are found in the state personnel manual. Each agency must tailor those policies to meet its needs.

For example, during the biennium our In-Range Salary Adjustment Policy was approved by the State Personnel Commission to move the salary of eligible employees upward in the salary range. This adjustment may correct one of the following factors: a salary inconsistent with a job change, a salary rate that does not match the labor market, or a salary inequity. Depending on the availability of funds in salary reserves, eligible employees may receive an increase in salary up to a maximum of 10 percent within a one-year period, if all criteria for any one of the above factors are met.

Changes were also made to the Grievance Policy. All disciplinary actions now must be in written form. Written warnings are not appealable. Employees are given a copy of the Grievance Policy and their appeal rights. Attorneys are not permitted to represent the agency nor the employee filing the grievance. A grievance committee shall be appointed by the executive director when grievances cannot be resolved at lower levels.

◆ Workers Compensation

The agency participated in a successful pilot program for workers compensation. Workers compensation claims are now handled by a third-party administrator. Claims must be reported within 24 hours of the accident or incident, and a copy of the claim form must be faxed to the administrator. The total dollar amounts for claims have continued to increase.

◆ Turnover/Retirement

The agency average turnover rate was about 6 percent, or 31 employees per year. The average hiring rate was also about 6 percent, or 29 new employees per year. The average number of employees who retired was 10 per year. The separations created vacant positions, and new employees were hired.

◆ Health Benefits

The state health benefits have improved. We now have access to 12 Health Maintenance Organizations (HMOs), in addition to the State of North Carolina Comprehensive Major Medical Plan. The rates are competitive, and employees have a wider choice. Employees can make changes to their health coverage and payroll deductions for health insurance, 401(k) plan and loans. The Personnel Section handles all of them efficiently.

◆ Composition

The Personnel Section lost its personnel assistant position and is now comprised of an accounting technician, a personnel technician and the personnel officer. This is the group that adds meaning to the statement that "No job is finished until the paperwork is done." We are an Equal Opportunity Employer. ⊠

A Legacy to Celebrate

NORTH CAROLINA Wildlife RESOURCES COMMISSION

In its 50th-anniversary year, the Wildlife Commission's 500 employees rededicate themselves to the oldest of our original goals–the conservation of North Carolina's wildlife and the habitat on which it depends.

Regulation

N.C. WILDLIFE RESOURCES COMMISSION

Management

KEN TAYLOR

KEN TAYLOR

Education

N.C. WILDLIFE RESOURCES COMMISSION

Enforcement

Research

N.C. WILDLIFE RESOURCES COMMISSION

1947-1997

A Fifty-Year Legacy

From 1947 to the present, the N.C. Wildlife Resources Commission and its personnel have managed the state's fish and wildlife, enforced the laws protecting them and educated North Carolina's citizens about wildlife's needs.

Cover photo credits (clockwise from left): Jerry Focht of Leonard Lee Rue Enterprises, N.C. Dept. of Travel and Tourism, Ken Taylor, Ken Taylor

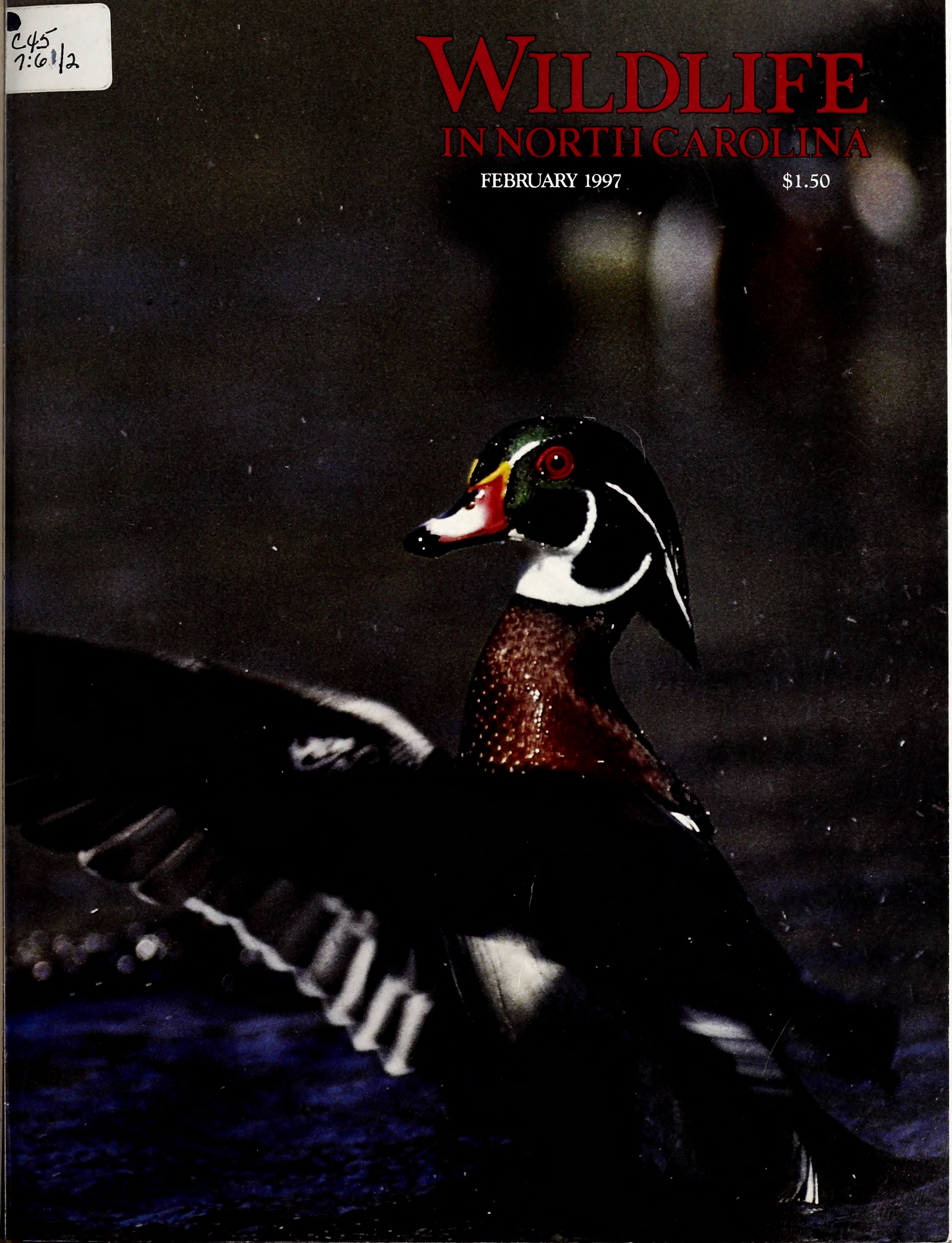
Periodicals postage paid at
Raleigh, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:6 1/2

WILDLIFE IN NORTH CAROLINA

FEBRUARY 1997 $1.50



Revenge of the Snapper

by Jim Dean

Anyone who spends a lot of time fishing or otherwise poking around on freshwater rivers, lakes and ponds is bound sooner or later to conclude that the snapping turtle is appropriately named. One look at those fearsome jaws mounted on the end of the thick coiled spring that serves as a neck is more than enough to instill respect even if you've never heard the old adage that those jaws, once clamped, won't open again until it thunders. Unless you're inordinately cautious, encounters with mature snappers tend to be memorable. Ask Phil Cable or Bill Williams.

ILLUSTRATED BY JACKIE PITTMAN

Back before it became the centerpiece of a high-dollar housing development, Sunset Lake was an old, blackwater millpond in western Wake County that occasionally yielded an outsized largemouth bass. Phil fished the pond regularly in an aluminum johnboat during the early 1980s, and on one of those trips he spotted a large snapper that was busily churning up the bottom in shallow water, apparently feeding in a bluegill bed. As it rooted, the turtle's aft end and tail were exposed. Naturally, this toothsome sight made Phil hungry. Snapping turtles are good to eat, and here was supper. Furthermore, the tail would serve as a convenient handle, indeed the only safe one.

"I eased the boat over, grabbed the tail, and hoisted about 25 pounds of ticked-off turtle into the boat," said Phil. "I wedged it into the space between the transom and the back seat next to the battery. Then, I went back to the front seat and resumed fishing. I could hear it scrabbling around and it wasn't long before I noticed that water was rapidly filling the boat. That got my attention because I was a long way from the landing."

When Phil scrambled to the rear of the boat he discovered that his snapper du jour had hooked one of its powerful claws into the ring of the boat plug and yanked it out. Equally disturbing was the fact that the turtle had backed into a corner over the open drain where it was well-situated to defend its handiwork.

"My only choice was to make a run for it," said Phil. "There wasn't a moment to lose."

Paddling furiously and running the electric motor wide open—a pitifully inadequate 12-pound thrust—Phil headed down the lake as the boat settled lower and lower, and moved slower and slower. With the seats practically awash, he finally managed to run the boat up on the bank just before it sank.

And the turtle? Phil ate it. After all, he figured on fishing Sunset again, and he didn't want to release his catch and take a chance that he might have to put up with a lot of snickering snappers when word got around.

As for Bill Williams, he has had a scar on his wrist since he was 9 years old as a result of having made a bad decision involving a snapping turtle—that being the notion that it would be a wonderful idea to blindly poke his hand into a barrel holding a live one.

"It's the kind of thing you're more likely to do when you're young and trying to impress someone," he said ruefully. "We had caught this snapper and I had this sudden impulse to frighten my visiting first cousin by lifting this huge, ugly, hissing thing out of the barrel. I didn't look closely enough before I reached in because I was intent on watching her expression. I grabbed what I thought was the snapper's tail. When I lifted it out, I realized I had it by a foreleg."

The snapper quickly arrived at the same revelation with predictable results. Bill doesn't recall whether it thundered before he got the turtle pried off his wrist, but he admits he really wasn't paying too much attention to the weather.

Bill also witnessed another gruesome encounter with a snapping turtle, an incident that took place some years ago on Santee Cooper.

"We were fishing for bass and heard someone hollering," he said. "We came around this point and saw a boat with a couple of fellows in it. One was down on his hands and knees yelling. Turns out that he had caught a big snapper while crappie fishing. His first mistake was bringing it into the boat, but he had made an even bigger mistake by trying to get the hook out. The snapper had clamped down on his index finger, and by the time we got there, the turtle had backed under a seat and dragged the fishermen with him.

"This poor man's partner was so scared of that snapper that he wouldn't help him," added Bill. "It was a pretty bad situation."

Yeah, but it could have been worse. The snapper could have reached over and pulled the plug.

February 1997
Volume 61, Number 2

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

N.C. DOCUMENTS CLEARINGHOUSE
FEB 13 1997
STATE LIBRARY OF NORTH CAROLINA RALEIGH

CONTENTS

4 Grouse in the Two-Tracks
written and photographed by Soc Clay ©1997
The ruffed grouse can be as hard to find as it is to center with a load of pellets. Late in the season, your best bet may be to move out of the thick, high country and hunt the lanes and logging paths.

8 At Large on Cedar Island *written by Bland Simpson* ©1997
photographed by Scott Taylor ©1997
At nearly 13,000 acres, the Cedar Island National Wildlife Refuge contains the largest unchanged salt marsh in North Carolina.

16 First to Tree *written and photographed by Mike Gaddis* ©1997
Go along on a squirrel dog field trial and you'll understand why feists and mountain curs have such staunch supporters.

20 Season of the Wood Duck
photographed by F. Eugene Hester and Jack Dermid ©1997
Inside thousands of duck boxes and tree hollows, spring is just around the corner for North Carolina's colorful native duck.

24 Along for the Ride *written by Burt Kornegay* ©1997
illustrated by Jim Brown ©1997
Except for the rain, it was just another canoe trip until we got to the bridge. That's when things got so weird I knew I couldn't tell the truth without disguising the name of the place.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

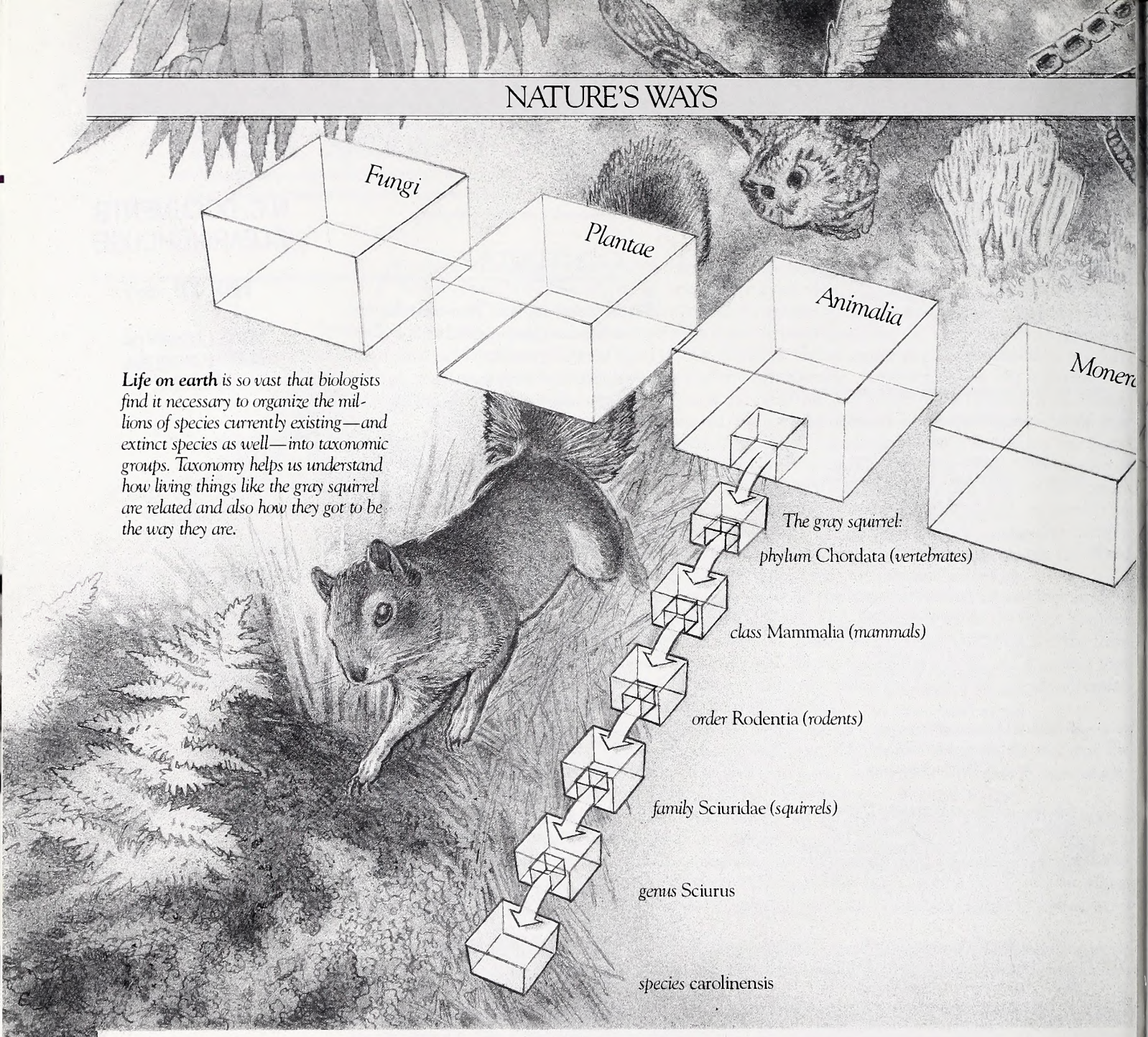
Nature's Ways *by Lawrence S. Earley*

Back of the Book *by Rodney Foushee*

Wildlife Through the Year *by Rodney Foushee*

Cover *A male wood duck displays its colors. Photographed by F. Eugene Hester.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**



Life on earth *is so vast that biologists find it necessary to organize the millions of species currently existing—and extinct species as well—into taxonomic groups. Taxonomy helps us understand how living things like the gray squirrel are related and also how they got to be the way they are.*

TAXONOMIC LEVELS

	Kingdom	Phylum	Class	Order	Family	Genus	Species
Southern flying squirrel	*Animalia*	*Chordata*	*Mammalia*	*Rodentia*	*Sciuridae*	*Glaucomys*	*volans*
Gray squirrel	*Animalia*	*Chordata*	*Mammalia*	*Rodentia*	*Sciuridae*	*Sciurus*	*carolinensis*
White-tailed deer	*Animalia*	*Chordata*	*Mammalia*	*Artiodactyla*	*Cervidae*	*Odocoileus*	*virginianus*
Brook trout	*Animalia*	*Chordata*	*Osteichthyes*	*Salmoniformes*	*Salmonidae*	*Salvelinus*	*fontinalis*
Cardinal	*Animalia*	*Chordata*	*Aves*	*Passeriformes*	*Fringillidae*	*Cardinalis*	*cardinalis*
Bald eagle	*Animalia*	*Chordata*	*Aves*	*Falconiformes*	*Accipitridae*	*Haliaeetus*	*leucocephalus*
Copperhead	*Animalia*	*Chordata*	*Reptilia*	*Squamata*	*Crotalidae*	*Agkistrodon*	*contortrix*
Bull frog	*Animalia*	*Chordata*	*Amphibia*	*Salientia*	*Ranidae*	*Rana*	*Catesbeiana*
Wolf spider	*Animalia*	*Arthropoda*	*Arachnida*	*Lycosoidea*	*Lycosidae*	*Lycosa*	*aspersa*

Taxonomy and Life

written by Lawrence S. Earley/illustrated by David Williams

All of us depend on order, whether we know it or not. It's part of our human inheritance to organize things. To find a grapefruit, we'd go to the grocery store, not the computer store. We'd look for produce, not for paper goods.

Bringing order to the world is basically what taxonomists do as well. They have to because they deal with such an enormous number of entities—the 3 to 20 million species of living things on earth.

One way of visualizing the work of taxonomy is by thinking of a large file cabinet with a number of drawers. Into one drawer go all the plants, into another go the animals, etc. until all life is divided into large categories known as *kingdoms*.

But it's not enough to throw things into a big drawer. A drawer containing 1,000 baseball cards would be of no use to the collector. You'd want to put the Braves players in one stack, the Yankees in another. You might want to divide them further—all the Braves pitchers, all the Yankees hitting .300 and above.

Similarly, taxonomists divide the big drawer labeled "Kingdom" into a number of *phyla* (singular is *phylum*). Each phylum is divided into *classes*, the classes are subdivided into *orders*, the orders into *families* and the families into *genera* (singular is *genus*). *Species* are grouped under the genera.

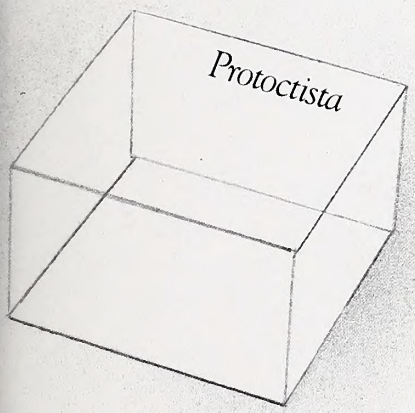
Classifying North Carolina's seven squirrel species provides an interesting example of taxonomy in action. The tree squirrels (gray squirrel, fox squirrel, southern flying squirrel, northern flying squirrel and red squirrel) and the ground squirrels (woodchuck and chipmunk) all belong to the animal kingdom. All of them possess backbones, so they are all grouped in the phylum containing the vertebrates (Chordata). They also share characteristics common to the mammal class and the rodent order. Because they possess certain features in common (bushy tail, lack of internal cheek pouch, V-shaped jaw) they also fall into the family Sciuridae—i.e., they are squirrels.

At this point, however, the taxonomist begins to detect differences. The five tree squirrels share characteristics that enable them to climb trees, but because the two flying squirrels have a gliding membrane they are packed off into a separate genus (*Glaucomys*) while the gray and fox squirrels share the genus *Sciurus*. Its small size and other traits give the red squirrel a genus all its own—*Tamiasciurus*. Because of very obvious differences between the chipmunk and the woodchuck, these two ground squirrels are placed in different genera—*Tamias* and *Marmota*, respectively.

It may be apparent that some of these classifications may be quite subjective. A flamingo, for example, is a lot like a heron (long legs, wading behavior) but it's also a lot like a duck (its bill has lamellae, or strainers). Should it be grouped in the order containing herons or in the order containing waterfowl? One study places it in its own order, but judgments like this are subjective.

Until a few decades ago, the plants and animals were considered the only two kingdoms. Advances in technology showed that bacteria and fungi were neither plants nor animals but deserved their own kingdoms. Scientists began to slice and dice. One resulting system contained 13 different kingdoms! A more modest taxonomic classification system today lists five kingdoms, the four above plus the Protoctista Kingdom containing algae, seaweeds and slime molds, among others.

Just because taxonomists disagree a lot doesn't make them disagreeable. After all, we need them to keep things organized.



Most taxonomic *classifications are organized into seven groups, ranging from the* kingdom *to an individual* species. *The taxonomy on these pages places all living and extinct organisms into five kingdoms—fungi, plantae (plants), animalia (animals), bacteria and protoctista. There are 33 phyla in the animal kingdom. Some contain just a few species, while others contain thousands. Most familiar animals—mammals, fish, birds, reptiles, amphibians—are vertebrates and are grouped in the Chordata phylum. They constitute a small minority (about 45,000 species). By comparison, the arthropod phylum (insects, spiders and crustaceans) contains at least 500,000 and perhaps many millions of species. Each phylum is further divided into many classes, and each class into many orders. Orders contain families, families contain genera, and genera contain species.*

Grouse in the Two-Tracks

The ruffed grouse can be as hard to find as it is to center with a load of pellets. Late in the season, your best bet may be to move out of the thick, high country and hunt the lanes and logging paths.

written and photographed by Soc Clay ©1997

I don't know if I've got another climb in me," I groaned to Harry Swint as he drove through the farm gate and pointed the four-wheel drive truck in the direction of a terribly steep-looking mountain that lay directly ahead. The thought of another climb for high-country ruffs was distressing. I'd made several ascents during the early season even though the air temperatures had been too warm for such serious workouts. But those climbs had paid off with some fast action in coverts made up of honeysuckle, greenbriers and sassafras saplings. At the time, I had believed that even a ruffed grouse in the Appalachians must live square on top of the highest peak it could find.

"We aren't going to climb much today," Harry assured me as he nosed the vehicle to within 100 yards of the mouth of a narrow path that showed it had been used as some kind of a haul road in the past. "We're going to do a little two-tracking on this trip, and that is easy compared to the kind of hikes we usually make for grouse in this part of the country," he added.

The time was late February, and the closing of the grouse season was nearly on top of us. The weather had moderated some from the unusually cold winter that had blasted the Appalachians the previous season. Harry was convinced that the warming ground in the lower elevations of the mountains would attract ruffed grouse to new-growth food delicacies that were just starting to show green down along the small creeks that plunged out of the higher elevations.

Pulling the truck into the middle of an old clearing that had once supported a corn crop, the longtime mountain grouse hunter explained that he had experienced the best hunting of the season during the thaw that had been occurring over the past week, as daily temperatures climbed into the 50-degree range for a few hours each day.

"Ruffs are always in the hollows at this time of the season," he added, as we uncased our shotguns and he opened the cage door and turned out his young English setter.

Stormy, a three-year-old, had been proving his worth during the entire season, and Harry was anxious to test the young setter on late-season birds in the deep hollows. "I think we'll find some birds pretty close to that

***Pointing dogs** like this English setter (left) are always helpful when hunting ruffed grouse. But they aren't absolutely necessary when pursuing late-season grouse once they've gathered along old logging paths that lead up low hollows.*

road ahead," he said. "Throughout the southern Appalachians, ruffs will wander down from the high ground to feed along the grassy strips in the old roads where narrow clearings on both sides let in enough sun to get green grasses and other plants to begin sprouting. You can often find these early signs of spring even when there's a covering of snow.

"Let's check the sunny side of the slope first," he said, waving the setter off the shady side of the hollow and pointing it up what he called the "warm side" of the grade. "Keep your eyes open, now," he warned. "These birds can be out in the road or, if they heard us or the dog, they will sometimes stop at the first clump of cover away from the clearing to wait and see what's happening."

We had walked perhaps 100 yards into the short hollow when the setter locked on point 30 feet up a bank where a large oak had tumbled over not long ago. Harry, a typical mountain hunter, with not a trace of body fat showing, sprinted to the far side of the downed tree while directing me to work up past the setter and see if we could force a flush.

Harry had trained his dog to hold steady to wing and shot, and he quivered on point as I eased past him and approached the base of the tree. My partner was already in position quartering uphill. "That's a good spot," he said, motioning for me to stop.

Once I was set, Harry picked up a flat, hat-sized rock and tossed it into the thicket of dead limbs. The commotion caused by the crashing boulder was matched by the thunder of wings as a ruffed grouse exploded from my side of the tree so quickly that it caught me off guard. I whirled, pointed the barrel of the old Ithaca autoloader in the direction of the rapidly disappearing bird, and squeezed off a shot, then another and a third.

"You winged him," Harry shouted, ordering the dog out on a dead-bird search. Minutes later, the setter returned with a male ruff, one of the largest I'd ever seen.

The short hollow produced two more flushes, and Harry was able to make a very tough, long shot with his over-and-under when a ruff flushed early. "That's why I use two different loads for late-season ruffs," he explained. "The way I see it, by the time February rolls around, these grouse have seen a lot of hunters and a lot of dogs, and they have become more and more wary as the season progressed. That's why I use a low-brass load with no. 8s for closer shots in the brush, then back it up with a high-brass no. 6 for the long targets."

Two-tracking ruffs is one of the most popular hunting techniques used in the Appalachians. Harry believes this late-season method for hunting ruffs provides the best success rate of the entire season. It's also a method that has drawn some criticism from sportsmen and biologists who believe hunters harvest too many surviving grouse that ordinarily would breed and bolster the ruffed grouse population for the next season. Some would like to trade the February season for an earlier opening. Indeed, birds killed late in the season could have the effect of adding to total mortality rather than being compensatory, as is the normal case. However, that is a concern only if the breeding population is low, and grouse populations in North Carolina have remained good. Grouse populations tend to be cyclical anyway, but doing away with the late season wouldn't change that, and such a move isn't considered necessary at this point.

For Harry, talk of losing the late season makes him nervous. Early October is too warm to hunt in the southern highlands, and too stressful for hunters and dogs. He would rather not surrender the most productive part of the season unless it's truly necessary.

In the southern Appalachians, the ruffed grouse has become more popular as hunting opportunities for bobwhite quail have faded.

***The tangle of** vines and briers along this "two-track" logging path offers ideal cover for late-season grouse. The birds come down from the higher elevations in search of new-growth greenery for food.*

"On many small farms, folks used to raise a lot of their own food," Harry told me. "This meant that small patches of wheat, corn, sorghum and other grains were cultivated on almost every available acre of tillable ground. Since there was no such thing as the bush-hog, fencerows and other nontillable acreage grew up in tangles of vines and brush, affording ideal cover for quail. That's when few folks hunted ruffs and even fewer knew anything about them."

By the 1950s, however, more and more people left family mountain and foothill farms to seek work in the cities. The old homeplaces were often abandoned, and the fields were allowed to revert to brush and sapling growth. This plant succession created favorable habitat for the ruffed grouse but spelled the beginning of hard times for bobwhites.

"By the time the early sixties rolled around, the ruffed grouse in the Appalachians had taken off like gangbusters," said Harry. He recalls those early days, when he was among the first southern hunters to have an avid interest in the bird. He believes that harsh winters during the mid-1970s reduced wild quail numbers even further and caused greater numbers of bird hunters to turn their attention to the ruffed grouse. Also, the use of smaller, ragged-edge clear-cuts in the mountainous national forests was creating a variety of habitat that favored native grouse.

For Harry, the two-track season is the most important of the year. "It's about the only time a hunter can pretty well predict where a ruff will be feeding," he said. As winter starts to wane, creating a February thaw, ruffs come into the lower hollows along grassy paths and dirt roads to find new-growth food. Because the narrow roadways keep the forest canopy at bay, food supplies can be plentiful both in the grasses and weeds that grow in the road and along the edges.

For Harry, the period between noon and 5:00 p.m. is usually the most productive. "Grouse follow the sun into the hollows, and if there is food there, they continue to feed until well after the sun has dropped over the next ridgeline," he said.

The technique for hunting is simple enough. Harry usually begins to hunt in any opening or path just outside the mouth of the hollow and follows it up the hollow. He warns that caution should be taken not to flush birds too quickly. The dogs are pretty frisky when first turned loose and may flush birds before you're ready. "I like to get the dogs settled down before actually heading into the prime area," Harry said.

Once the hunt begins, Harry will usually mosey along the road while his dog criss-crosses the bottom of the hollow and works up the slope on each side. It's easy to see the dog on point on either side of the hollow when using the road to separate the slopes.

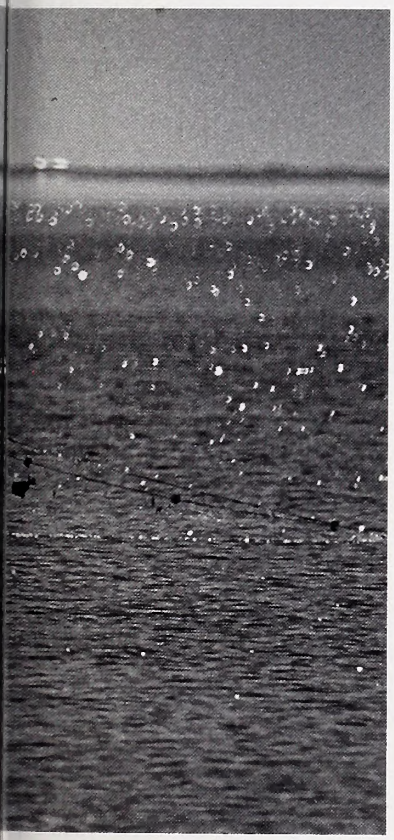
There may be no such thing as an easy grouse hunt in the rugged Appalachians, but hunting the two-track roads is the closest thing to it. And for avid grouse hunters like Harry and out-of-shape hunters like myself, February is without question the best time. ⊠

Hunters examine *a grouse taken in the brushy opening of an old homeplace near a logging road in the southern highlands. February can be the most productive time for grouse as they follow the sun and its warmth into such clearings looking for food.*

At Large on Cedar

Looking east towards Core Banks

ISLAND



At nearly 13,000 acres, the Cedar Island National Wildlife Refuge contains the largest unchanged salt marsh in North Carolina.

written by Bland Simpson ©1997
photographed by Scott Taylor ©1997

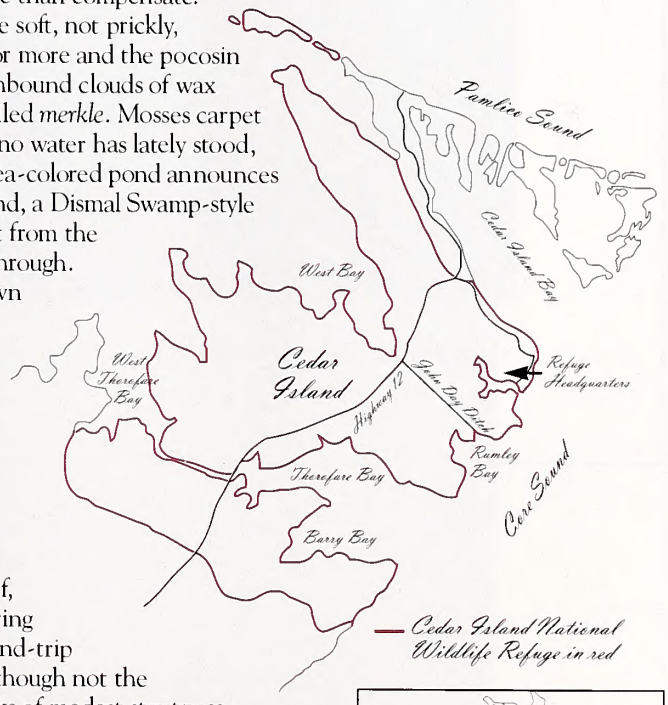
The grassy wildlife road is tabletop flat and seems nearly shot straight. It is an easy lowland walk, not quite 3 miles from the highway, N.C. 12, to the lane's terminus in a little creek and cove opening onto West Thorofare and West Bays, with Pamlico Sound off in the far distance beyond Point of Grass. Along this outback path just below the Thorofare channel that separates mainland Carteret County from the vast Cedar Island marshes, there is no shortage of variety or reward.

At Old Christmastime in early January, doves and sparrows flush before the walking party in half-dozens and dozens, rise and fly up into the brilliant red-berried yaupon along the roadside. There is blue gentian in the pine barrens off to the side, the little flower with five lavender-blue petals and the green-gold interior. Bracken fern is everywhere, and nearly a dozen varieties of blueberry call this place home. In the pine savanna near N.C. 12, at the start of the walk, skeletal trees from a fire 10 years ago stand stark against the winter sky, but healthy longleafs on the road's north side more than compensate. The cedars in here are soft, not prickly, with berries. A mile or more and the pocosin starts closing in, earthbound clouds of wax myrtle hereabouts called *merkle*. Mosses carpet ditch bottoms where no water has lately stood, till a very small and tea-colored pond announces a gum and poplar stand, a Dismal Swamp-style landscape so different from the savanna just passed through.

We had eaten Down East hearty the evening before—goose and pastry and rutabaga stew, sweet potatoes and collards—and I was glad of it. An easy walk, yes, yet even at low altitude and with no topographical relief, keeping pace and staying warm on a 6-mile round-trip at Twelfth Night are, though not the strenuous life, still tasks of modest stoutness. The more we keep at it, hoofing down the lane, the more robins we see, an abundant crowd, and we are reminded that this blackbird was once as much a part of the Down East diet as the goose.

At Caduggan Creek is an old log bridge, a remnant rather, its planking now down to one 2 by 12, but river otters slide nearby with no concern for the roadway's fate. After the miles of field and forest, our longer view over the bays toward the marshes and the sound is spectacular, the way it opens out. There is no question *whether* about coming back, only *when*.

Nearly three months later, we are drawn here again,



Vicinity Map

and pine pollen like gold dust is everywhere. So, too, are mosquitoes. The word from Ann's father, one who walks the wildlife road daily, is that they have been evident all winter, for the first time ever. And these are "high-wind mosquitoes," said to be undaunted and unmoved by stiff breezes. This spring morning's wind, presaging afternoon and evening gales and rains, proves out the word—mosquitoes hang in it, seeming to wait a turn to light and feed as if they were endowed with patience as well as hunger. Nothing to be done about them but slap and spray and marvel. But there is something far more promising and pleasing in the wind than the voracious insect: there is the scent of another abundance at hand, more yellow jasmine twining and blooming this year than anyone can ever recall, and in this corner of the wildlife refuge, at least, the lowlands are redolent of lemon.

The Cedar Island National Wildlife Refuge—10,000 of whose nearly 13,000 acres are the largest unchanged salt marsh in our state—takes in all of Down East Carteret County between the fishing village of Atlantic and the high grounds of upper Cedar Island fronting upon Pamlico Sound, including the last mile or two of barrier strand west of the Cedar Island ferry slip out to Point of Grass. A map of refuge holdings looks like a crab-gnawed *N* tipped over to the left. Hundreds of thousands of people visit the refuge as they motor N.C. 12 to or from Cedar Island ferry, and there is an undeniable simple grandeur to the vast, 5-mile prairie of marsh they traverse. Shank's mare and a boat of shallow draft afford one even more of this paradise, though, and the sheer size of the Cedar Island refuge lands, in conjunction with the national seashore of Core Banks and the big waters of Core Sound between them, make it a wilderness well worth note and more exploration. Public landings are at the N.C. 12 bridge over the Thorofare and where the Lola Road runs out into Lewis Creek.

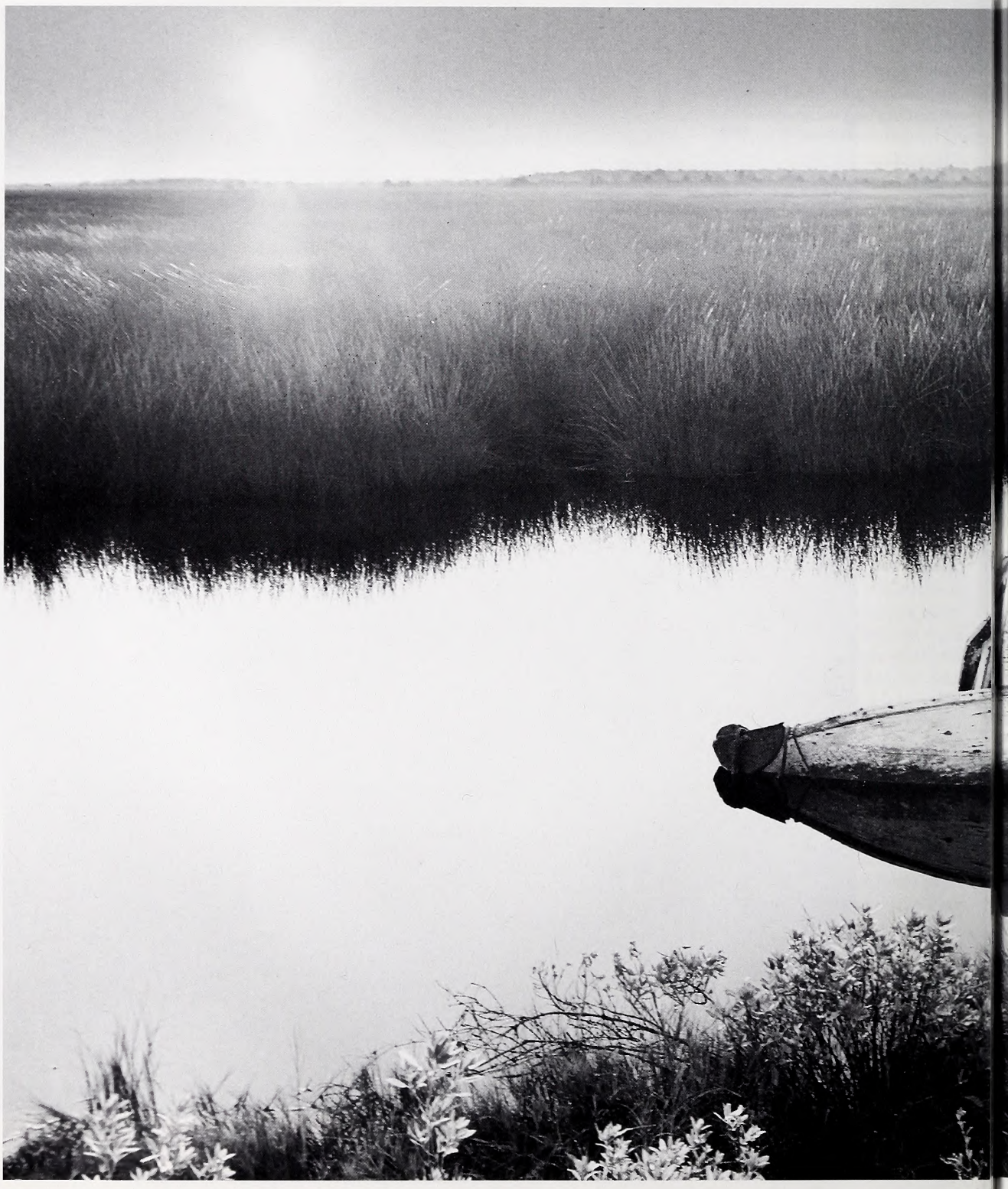
From the high bridge: Rumley's Hammock in the distance

Another good port and point of embarkation is Don and Katie Morris's Marina just above Atlantic, whence my wife Ann and I late one summer morning lit out in her father's 21-foot fishing boat for a circumnavigation of the old Hunting Quarters—the land mass so named by Indians and early settlers that includes present-day Sealevel and Atlantic as well as the southern part of the refuge. Down Core Sound we boated, past Styron's Bay and then up into Nelson's Bay, under the Dan Taylor Bridge and into the small creek at its head, Salter's Creek. As we cruised slowly through the cut carrying us north again toward Long Bay, I heard from Ann's father, Dr. John Kindell, a thing or two about Sealevel's Dan Taylor, who had remembered his roots and raising and underwritten the Sealevel Hospital. Taylor long ago formed with his brother the West Indies Fruit and Steamship Company and made a fortune in shipping, starting with Dan Taylor's buying up and warehousing near-worthless ballast salt in the Virginia Tidewater and then being lucky enough to be the one holding salt in quantity at the outbreak of World War I, when governments wanted it, lots of it, and quickly.

Out the creek at the upper end of the cut, in 10 or 12 feet of water in Long Bay, we tried to beat the still and near-suffocating July heat with a swim, but a gracious plenty of jellyfish drove us without delay straight back into the boat. Under way again, we rounded Long Bay Point and came down West Thorofare Bay, within a mile of the otter slide on Caduggan Creek that we have hiked to.

Three dozen porpoises fell in with us, escorting us down West Thorofare Bay. Porpoise pods of no small size abound in these waters, and in other reaches nearby—our friend Peter Reeves of Lenox Point has while kayaking come upon a hundred in North River, and Ann and I happened last summer upon a well-known commune of several dozen that had taken up residence around the mouth of Core Creek in the upper Newport River. Hard to imagine it nowadays, but, in addition to the whaling that once went on along the central coast, porpoise too was a commercial catch, memoirist Clarence Robinson (Atlantic High School, class of '11) recalled: "There was a little porpoise fishing on Core Sound in 1880. Someone said it took five or six porpoises to produce a barrel of oil. Before the turn of the century I saw a porpoise seine, about ten-inch mesh, stored in an old house." And coastal historian David Stick wrote that in the late nineteenth century there was a porpoise factory down the sound at Lookout

End of gated walkway off Highway 12



Last rites off Highway 12

NC4020C

Abandoned pier at Cedar Island

Woods, just west of the cape.

Where the Thorofare cinched up, the porpoises started dropping away from us, turning and cavorting back toward West Bay and Pamlico Sound. Under the N.C. 12 bridge we went, then across Thorofare and Barry Bays, around Hall Point, and back to Don and Katie's little marina, the whole roundabout taking some three or four hours.

Other summer times, and these are the children's favorites, we would stop in at Don and Katie's and from there, armed with a sack of cheeseburgers and chili dogs, french fries and onion rings so big that three filled one of those small red-and-white paper boats and constituted a full order, we would come out the marina channel into Core Sound and bound, usually with the wind, northeast up the sound and straight across Thorofare Bay.

It was the Hammock, Rumley's Hammock, we were boating for, there to set the small anchor somewhere along the pine island's half-mile south-facing sand beach that runs between salt marsh on the west and Lookout Point in the sound on the east, to picnic and swim and swat at greenheads for an hour or two. Maybe walk down to the point and watch the waves cutting away at the corner where the Hammock turns north for Fish Hawk Point and Rumley's Bay. Such storm-tide flotsam as old net floats and crabpot buoys—broken and blown loose from their charges—that we have regularly fished out of the shallows near the Hammock's beach have since made their way into our coastal Carolina chowderhouse musical, *King Mackerel*, and onto faraway stages in Wilmington;

Washington, D.C.; and New York City—so Cedar Island goes with us not only in our hearts, but in our touring trunk as well.

At the head of Rumley's Bay there is one more thoroughfare through these marshes primeval, John Day's Ditch from Rumley's to West Bay, hired dug in 1927 by Day (a cabin-boy-become-sea-captain whom the East Coast and West Indies trade made wealthy) mainly as a fence to hold in the hundreds of head of cattle. Captain Day was attempting to graze free-range on Rumley's Hammock, but they kept wandering up toward Cedar Island's high ground to the north and feeding on Captain Day's neighbors' gardens. Island historian Jean Day wrote that in addition to his livestock operation the captain had the first car on Cedar Island and also had himself a clubhouse out on Rumley's Hammock. With a caretaker. And the caretaker had *him*self a still there on the Hammock and a ready market for his goods down in Atlantic. When hogs high on mash and staggering back for more led the law right to the unbonded distillery, though, the caretaker went off to stir elsewhere for a spell in a state-owned club called the Big House.

The bootlegger and his works are long gone, and Captain Day's efforts at establishing productive oyster beds up his waterway came to naught as well. Perhaps there are mullet to be had up John Day's Ditch, but Ann's best recollections of fishing down this way are of going to the Thorofare bridge with her father when she was a little girl. "That's when I really started to like trout," she says, "catching those Thorofare trout."

Ann also recalls a rather different sport: war games originating at the Marines' Atlantic Field, which is adjacent to the refuge at its southernmost point. She remembers how during the games airplanes dropped flares by parachute out above the Cedar Island marshes, and how a couple of times those military nightlights torched the whole wet prairie. "You could drive out to the Thorofare, out on Cedar Island Road," she says, "and see a line of fire burning across the marsh at night."

The great marsh has long since renewed itself, and a large part of the pleasure of that renewal is in its wealth of bird life—from the resident herons, rails, egrets, fish crows, marsh hawks and kingfishers to pilgrims like the warblers coming up from lower latitudes in springtime and the thousands of redheads and scaup and black ducks moving south to Cedar Island in late fall, waterfowl populations peaking here in December and January. A belted kingfisher, like one of those who await dinner sitting so nobly and patiently on canalside power lines flanking U.S. 70 and N.C. 12, has taken up residence with us in the red-clay country far from his, and Ann's, Carteret County home—he feeds mostly off admiration, though, for he is a creation of Atlantic carver Lionel Gilgo.

Cedar Island is at the end of the world, at the heart of our coast. It may not be the place where the Lost Colony *really* settled and lived on, as some have suggested, but it is and in perpetuity will be a colony of the wild, flooded at times unpredictable by tides of the wind and not the moon, less known and perhaps less appreciated than others in the great chain of refuge that includes Mackays Island, Pea Island, Alligator River, Pocosin Lakes and Swan Quarter. By foot and boat, by parked car along the road shoulders of the causeway transecting the marsh, it is ours to share with the deer and the rare bear, with many thousands of birds and some millions of insects; so along with a pair of binoculars we bring a pair of canisters filled with something to ward off the biting flies and the mosquitoes, even if they, once warded, do not go away but just hang there in the high winds and regard us hungrily.

"Those mosquitoes are the best thing we got going for us on Cedar Island," Mr. Worth Harris, a survivor of the Great Hurricane of '33, once (according to Jean Day) told the water-softener man, adding: "Well, you see, it keeps the Ding-Batters out."

Not all of them, Mr. Worth. Not quite all. ⊠

Great blue heron

Rumley's Hammock

First to Tree

Go along on a squirrel dog field trial and you'll understand why feists and mountain curs have such staunch supporters.

written and photographed by Mike Gaddis ©1997

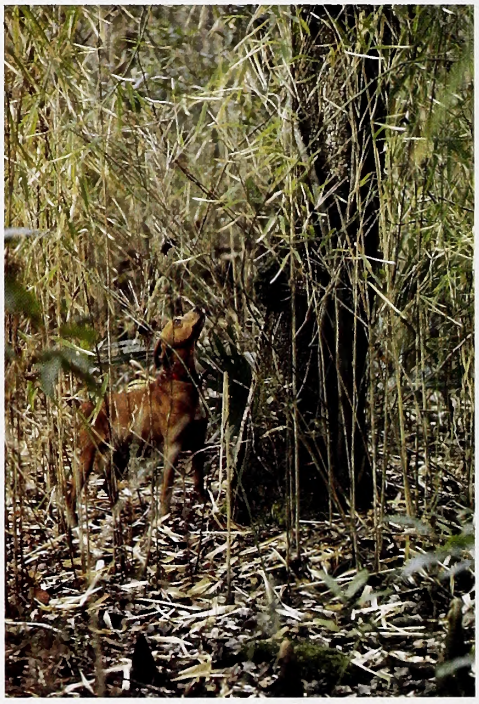
At the heart of every southern boy who's ever crossed wits with a bushytail is an intense yearning for a squirrel dog. Not just a barnyard shepherd that cuts a few yelps in a sight race, but a true specialty dog that searches 'em out, barks tree and won't lie.

For some, this craving is ageless, lapsing into remission for years of quail, bear, deer and other glamour game, then reemerging consumptively in later life. Whenever it gains the upper hand, it's frequently confounding. Like Diogenes in his search for an honest man, those with the itch find that a good squirrel dog doesn't come easily.

"There's a lot of frustration in the beginning," a stricken hunter confided. "Matter of fact, there's a lot of frustration all the way," he chuckled. "I've been trying since '87 to train a squirrel dog. I've trained retrievers and deer hounds; they're easier. But pine trees and hollow logs have about worn me and the squirrel dogs in the ground."

Some impassioned eastern Carolinians, however, are proving that the quest is not only feasible, but quite rewarding. It's a small group divided between three enthusiastic squirrel hunting associations at Raeford, Hubert and Elizabeth City, and they are using the venue of competitive treeing-dog hunts to proof-test breeding and training programs. In a few short years, it has paid handsomely, resulting in a number of champion and grand champion dogs.

North Carolina is a relative newcomer to competitive squirrel-dog hunts, which have a modestly impressive national following. "You can trace the regional origin and popularity of squirrel-dog trials by historical preference," says Seth Gault, editor of *Full Cry* magazine, the flagship publication of the treeing dog fraternity. "In the South, folks leaned toward hunting with dogs, while in the North, it was mainly still-hunting. So squirrel dogs and trials became popular in Kentucky, Tennessee, Louisiana and Arkansas and gradually spread north and west. Our recent listings for squirrel hunts include events in Ohio, Michigan, Pennsylvania, Wisconsin, Texas and Oklahoma."



A hot tree has *River City Chelsey's undivided attention as she looks for a squirrel in the upper branches during a field trial early last spring. Chelsey is a mountain cur.*

Competitive hunts seek to promote and exalt the traits that characterize outstanding squirrel-dog performance, thereby establishing desirable standards for breeding and training. They also, of course, afford an enjoyable opportunity for folks with common interests in good squirrel dogs and squirrel hunting to get together, savor the sport and vie for top dog. The most challenging competitions are sanctioned by the World Tree Dog Association (WTDA), the United Squirrel Dog Registry (USDR) or the National Kennel Club (NKC). Wins and placements in sanctioned hunts award championship points toward the coveted titles of Squirrel Dog Champion (SDC) and Grand Champion Squirrel Dog (GCSD).

Basically, a competitive hunt is conducted in several simultaneous casts during a two-hour period. Each cast is normally composed of three dogs, their handlers, a judge/scorekeeper and spectators. The dogs are "cast," or released to hunt, with the goal of accumulating "tree points." "Plus" points are granted when a dog trees and a squirrel is observed. "Circle" points are awarded if no squirrel is observed and it appears likely that dense foliage or hollows are to blame. "Minus" points are assessed for faults—for example, when a dog that has declared treed abandons the site before the hunting party arrives. When time expires, the dog with the greatest number of tree points wins the hunt.

While squirrel dog trials are open to all treeing dog breeds, treeing feists and mountain curs are the most prevalent contenders. Both are small dogs, quick and light on their feet. They are recognized as specialty breeds by the American Treeing Feist Association and the American Cur Breeder's Association respectively. The breed standard for the feist calls for a dog of 10 to 19 inches at the shoulder, 35 pounds maximum, keen muzzle, cocked ears and short coat. Feists may be black, white, tan, red, lemon or yellow, or any combination of these colors. Mountain curs are powerfully built dogs of 17 to 24 inches and up to 60 pounds, deep-chested and short-muzzled, with the overall appearance of a scaled-down bull terrier. Coat variations can be striking, from solid black, buckskin, blue, red or yellow-to tiger-striped brindle or leopard.

Tracing the ancestry of either breed to its rootstock would give the best genealogist a migraine. Both are products of early pioneering and farm propagation, where whatever happened to be serviceable and available was perpetuated. Indeed, almost anyone with gray at the temples who grew up in the South can remember frequent reference to any mixed,

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

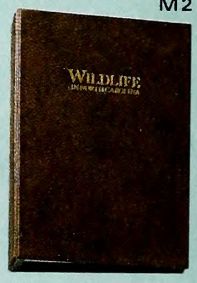
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

Wildlife in North Carolina Magazine

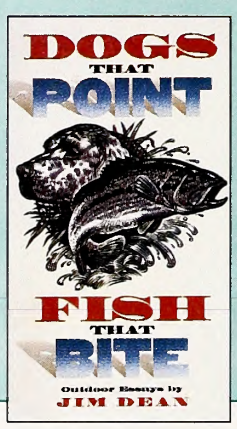
See our easy-order subscription form on back!

- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**

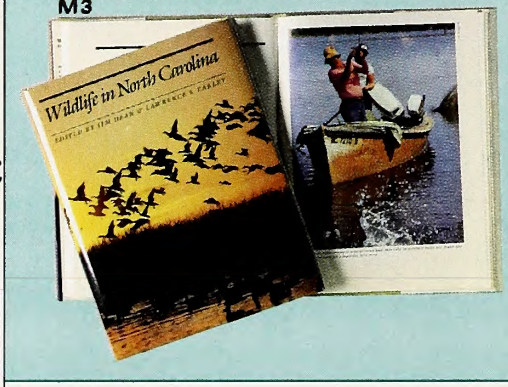
M2



- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**



M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

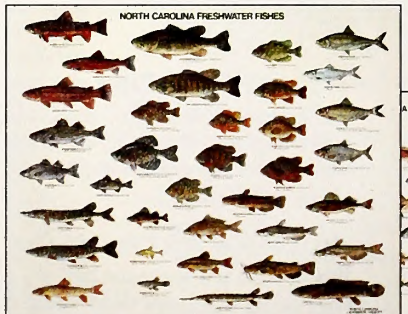
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

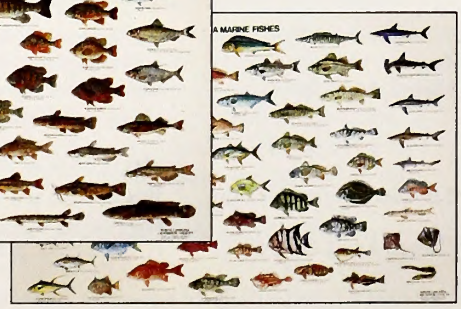
- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**



P6



P7

P3 P4 P5 P8

- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

MAGAZINE SUBSCRIPTIONS

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

MAGAZINE GIFT SUBSCRIPTIONS

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

_____ Magazine/gift subscriptions **TOTAL**

EDUCATIONAL MATERIALS

WS97

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL**	$
Discount (subtract 15% discount for **retail** orders of $100 or more)	$
Sales tax *(N.C. residents add 6% sales tax)*	$
Educational materials **TOTAL**	$

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

- ☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
- ☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.

Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____

Lifetime License $ _____

Lifetime Magazine $ _____

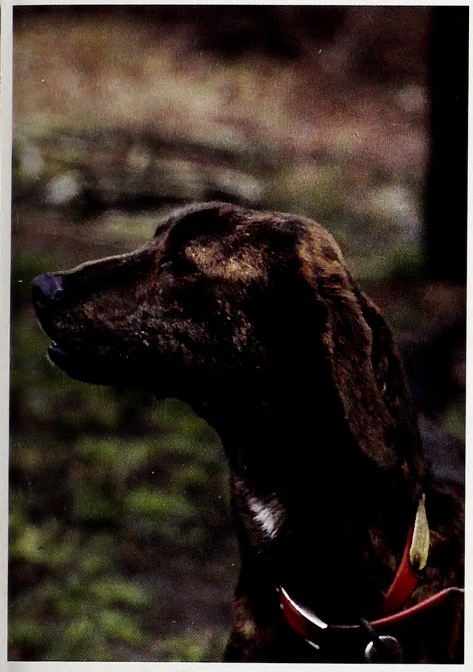
Total Charge $ _____

Authorization Code Number

_____

Printed on recycled paper

N.C. Wildlife Endowment Fund



All treeing dogs *are welcome at squirrel dog trials, but two species of dogs are most common, the mountain cur and feist. These dogs, Brandy (far left) and Rambo, are both mountain curs. Each breed has its own fiercely loyal followers who have formed associations to maintain breed standards and hold trials to compare performance.*

A hunting party *(below) gathers in the woods to tally the scores at the end of a hunt. Though squirrel dog events have not attracted the same widespread attention as bird dog and retriever trials, the competition is keen and participants—dogs and owners—have lots of fun.*

pocket-sized mongrel with a hint of rat terrier as a "fice." The cur, the older of the two, is likely a concoction of Tennessee and Kentucky mountain coon hound, tempered with a strong dose of bull terrier and even a sprinkle of Catahoula. As is almost always the case in such instances, a landmark breeder or two comes along sooner or later and takes the issue to heart, gradually carving out a dog that breeds true to type. Thereby, the "Thornburg feist" and "Kemmer cur" have become familiar touchstones.

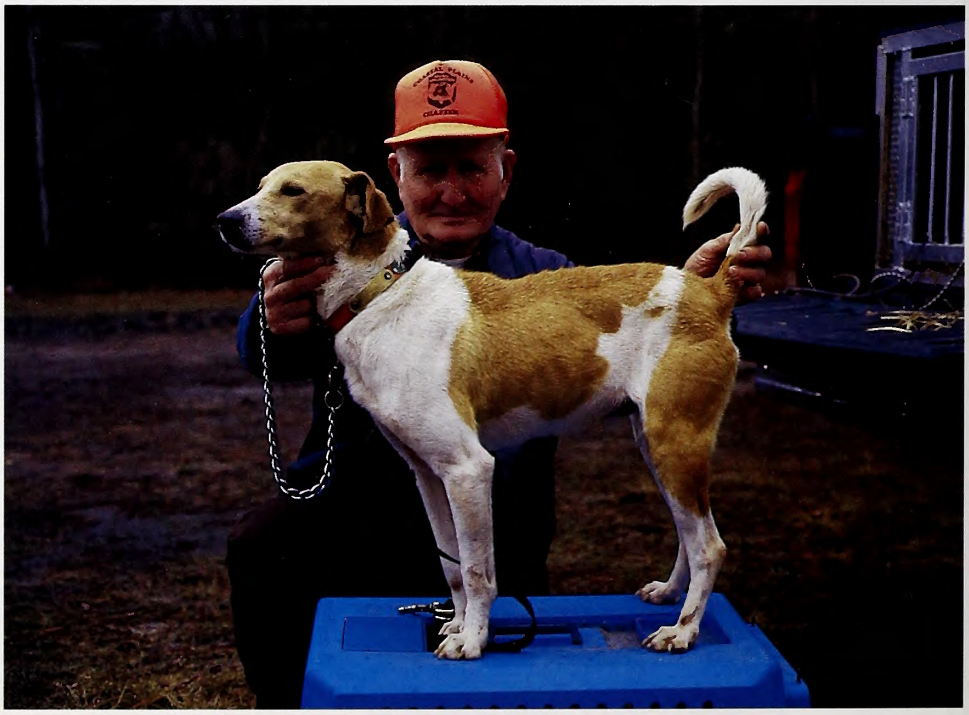
***Frank Altizer of** Hampton, Va., (left) with Altizer's Goldie and Joe Moore of Hubert, N.C., with Virginia Mountain Holly were the winners of last year's North Carolina State Squirrel Dog Champion Hunt.*

Among squirrel-dog fanciers, the choice of feist or cur is personal. Both dogs are ideally suited to the purpose, whimsically appealing and a delight to watch through the woods.

Bernell Pittman of Jacksonville, age 64, has been "messin'" with squirrel dogs all his life. Active in competitive trials for the last six years, he's done pretty well. His current contender, SDC and GCSD Pittman's Sneaky, a treeing feist, is in his colorful estimation "a rite fa'r little dog." Like most squirrel-dog enthusiasts, he hunts Sneaky for pleasure between trials.

In evaluating young dogs for potential success in competitive hunts, Pittman looks for lots of natural hunting desire and hustle. "I want him busy and I want him doin' it on his own," he says. "You can't find a squirrel if you're standin' still. I like for a puppy to get out and hunt, but still listen to you, too."

A dog with championship potential must possess superkeen ears, eyes and nose, be constantly industrious but stealthy in the quest for game, and quarter the woods efficiently. The dog's working range should be in the neighborhood of 100 to 200 yards, and when it jumps, sights or scents a squirrel, the dog should hold its tongue, reserv-



***Bernell Pittman,** who has been raising and running squirrel dogs for 64 years, poses with Pittman's Sneaky, a treeing feist.*

ing voice for tree. On the tree, the dog is expected to have a good, steady chop (sharp, staccato bark), loud enough to hear at some distance. If the squirrel moves, the dog must follow it through the trees by sight. A good squirrel dog has to like people, because it has to work with minimal handling, and it can't be intimidated by other dogs and handlers. When another dog trees productively, your dog is expected to come in and honor. All in all, quite an order.

So how do you train a squirrel dog? "I like to start a puppy at about nine months," contends Pittman. "I'll take him out, shake the vines and show him a squirrel... get him used to lookin' and huntin'. Then I'll shoot a few out, so he can get his mouth on 'em. A good 'un will move from there to trackin', barkin' tree, and followin' them through the trees. He has to do that on his own. Some never do."

Wesley Brown, who campaigns SDC Brown's Wild Cote, a leopard-colored treeing cur, agrees: "You can start 'em and get 'em along by being smarter than the dog, but there comes a time when the dog has to do the rest." Also, both accede that it's easier to train a dog in latter-growth hardwood forests than in pine and mature timber.

How long does it take? "One season for a good one," attests Pittman. "If a young dog has it, he'll show it the first year." And how many dogs do you have to go through to get a Sneaky? "You don't want to know," he grins.

The North Carolina State Squirrel Dog Championship is an annual event to pick the best of the best, and with the rush of my own boyhood adventures with bushytails rekindled, the pilgrimage to Hubert was a happy one. Even the knotted, blue-gray clouds of a two-day wet weather system, still welted up about the sky like bruises on the face of a battered fighter, showed signs of healing. If the sun popped out as the weather prophets promised, the squirrels should move.

The Eastern North Carolina Squirrel Hunters Association, which hosted the 1996 championship this past March, did much to abet the occasion. Ed Salter, Joe Moore, Amos Taylor, Gary Treece and company "put on the dog," kicked off by a community dinner (that comes midday for you transplants). For 4 bucks you got your choice of a thick and hearty Brunswick stew or a creamy, homebred clam chowder. I chose both and never looked back. Gallons of iced tea and buckets of hot hush puppies helped them down.

Ten of the top dogs in the region toed the line, which resulted in a draw of two three-dog casts and two two-dog casts. After Ed Salter reviewed rules and procedure, and introduced Joe Moore as master of dogs, we adjourned to nearby Croatan National Forest, where the hunt was staged.

At Haywood Landing, I attached myself to a mixed cast made up of Ted Treadway's mountain cur Rambo, Kenny Pittman's feist Jack and Buddy Bozeman's cur Kelsey. Gary Treece, our judge, signaled the start, and the hunting party proceeded in a quiet line along a marked, wooded path that traverses rolling ridges, shallow hollows and flats. Mature oak, poplar and beech top the high ground; a light understory of bay, gum and holly stipples the bottoms.

The curs were immediately out and busy. Kelsey zipped lightly across the flat of a forward ridge to the brink of an adjoining hollow, where she stopped dead still for a half-minute or longer, listening and watching intently. Presently, she eased into the low ground. We stopped and listened. Rambo could be heard at a distance, working across the same ridge. Jack was still close at hand, holding his play. Tentative yips rose from the bottom, then the steady beat of a tree bark.

"That's Kelsey," Buddy declared. "Tree, Kelsey!" Shortly, Rambo opened. "Tree, Rambo," called Treadway. Off we ran. The bottom was thick going, the ground rotten, as we slogged swamp mud, evaded greenbrier, crawled logs, fought the baybush. Over, under, around and through. Caps went flying. Buddy went in over his boots.

Chop, chop, chop, bawl, chop! The dogs were in a frenzy when we finally reached the tree. Quickly, the handlers tied the dogs off and searched for game. A mud-splattered Buddy grabbed a sky-bound vine and shook it violently, then beat the tree trunk with a dead limb, while Ted and Kenny circled, trying to spot the squirrel. The curs said he was there. Jack was uncommitted. The five-minute limit expired. No squirrel was moved, though the tree had a suspicious hollow. Circle points were recorded.

Twenty minutes later, it was Kelsey again. Then Rambo, same sequence. The dogs were under an immense poplar, a tremendous pine next door. Once again, considerable effort was expended, but no squirrel. The party majority theorized that the uncooperative varmint had taken refuge in the thick limbs and needles of the pine. More circle points. Ten minutes later, it was a repeat performance at another site. You can't win a hunt this way. Then Kelsey was penalized with minus points for leaving a declared tree.

The hunt faltered for a spell. The squirrels seemed inactive, so a short time-out was called. It only added to the frustration. When we resumed, Kelsey kept coming up dry, as did Rambo. We finished the two hours without sight of a squirrel. Jack never got into it, uncharacteristically absent of hunt. Someone suggested his sex life had been overpowering lately—he had been bred a lot.

***Joe Moore,** Master of Dogs for the 1996 North Carolina Squirrel Dog Championship, poses with his two mountain curs, Virginia Mountain Holly and River City Chelsey.*

That observation was corroborated, and soon there was a consensus that, yes, Jack was indeed the victim of love.

Fortunately, other dogs had fared better. Back at the clubhouse, Virginia Mountain Holly, Joe Moore's 18-inch brindle mountain cur, was named State Champion. Holly had earned her winning 500 tree points by being first to tree five times. At one tree, three squirrels had been moved. At just under 2 years old, it was a great win for her, but then she had won a National Kennel Club squirrel champion title when she was only nine months old. Another youthful mountain cur, Altizer's Goldie, owned by Frank Altizer of Hampton, Va., placed second with 225 points.

I was halfway home, still caught up in the postmortem excitement, when it smacked me like a rhinoceros beetle riding a tailwind. I had forgotten to ask Bernell Pittman where a fellow might run up with a decent squirrel-dog prospect, and just how much it would set him back. I'm prepared for the worst. ⊠

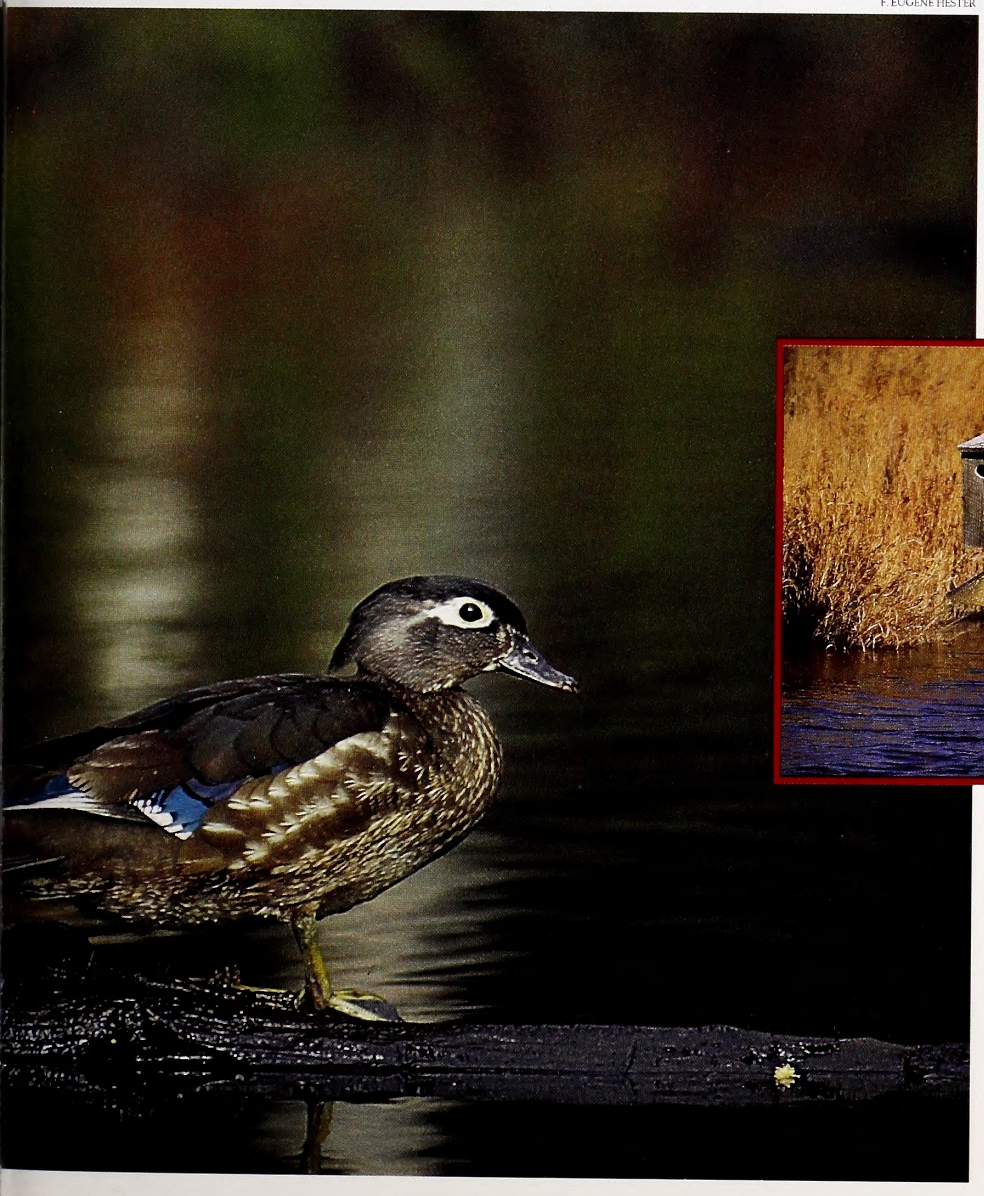
Season of the Wood Duck

Inside thousands of duck boxes and tree hollows, spring is just around the corner for North Carolina's colorful native duck.

photographed by
F. Eugene Hester ©1997
and Jack Dermid ©1997

F. EUGENE HESTER

F. EUGENE HESTER



Right now, pairs of wood ducks are looking for nesting cavities where the hen will lay her white eggs on soft down. After a month of incubation, the eggs hatch and the tiny youngsters huddle together briefly for warmth (left).

F. EUGENE HESTER

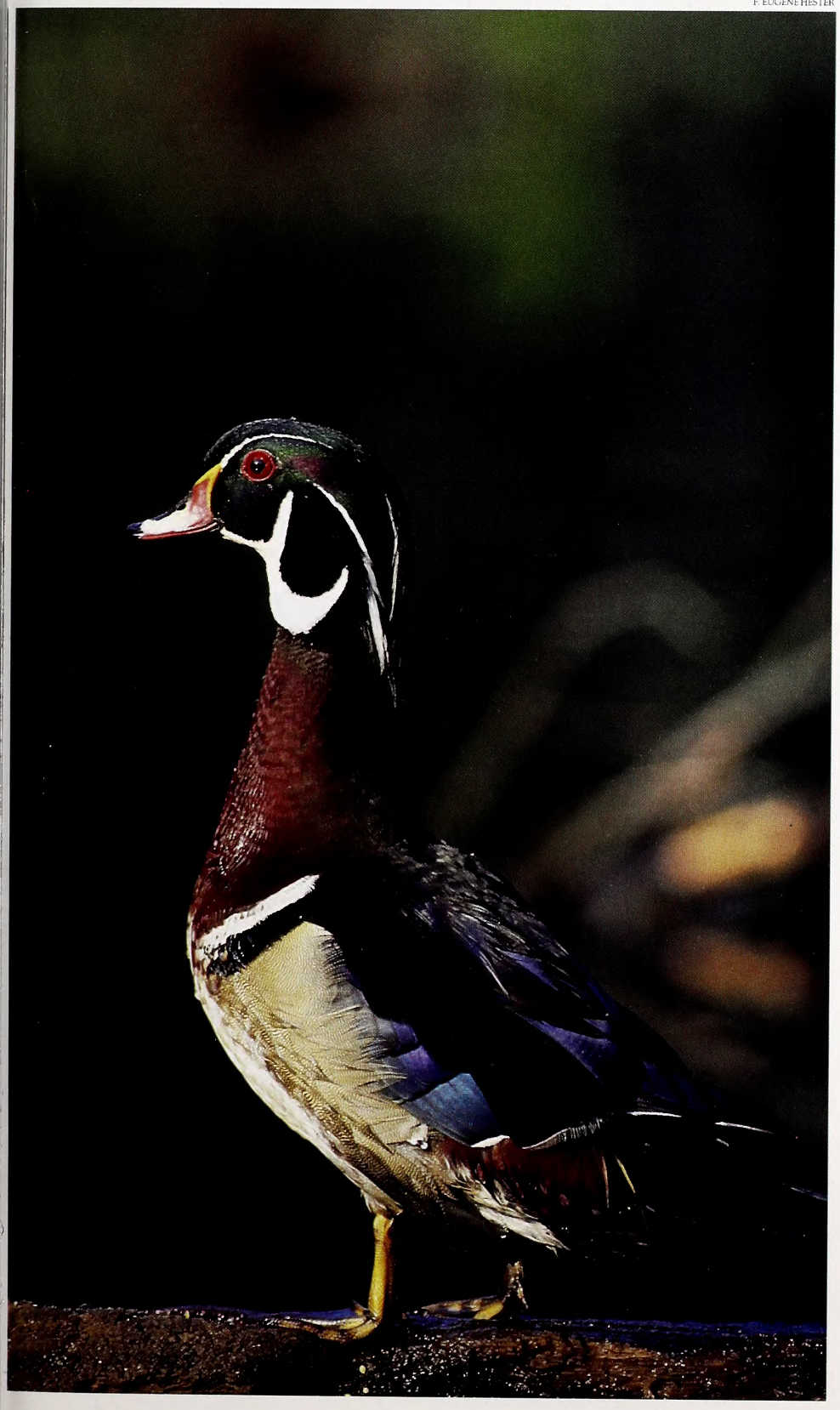
JACK DERMID

JACK DERMID

JACK DERMID

JACK DERMID

F. EUGENE HESTER



A day after the last down-covered duckling has hatched, the mother leaves the nest and softly calls to her young (far left, lower middle). One by one, the day-old ducklings climb to the opening, leap and fall like powderpuffs to the pond surface (far left, lower right). By then, the gaudy male (left) is long gone, leaving the rearing of his family to the female.

Along for the Ride

Except for the rain, it was just another canoe trip until we got to the bridge. That's when things got so weird I knew I couldn't tell the truth without disguising the name of the place.

written by Burt Kornegay ©1997
illustrated by Jim Brown ©1997

Daylight was dying, rain was falling, and the temperature was stuck at 37 degrees when a friend—call him Len—and I pulled up to the bank of eastern Carolina's Swampy River that bone-chilling Friday last winter with a canoe strapped to the top of my car. Len had a cold, and he was sniffling and sneezing. But it was the only three-day weekend we had to canoe together, and he was game to explore the river.

A local man named Terry rode with us. We'd hired him to meet us with the car on Sunday at Hurton Bridge, 50 miles downstream. Floods were in the forecast, and we knew we might have all the adventure we wanted. What we didn't know was that the biggest adventure awaited us at Hurton Bridge itself.

We pulled on rain suits, unloaded the canoe and tied in the gear. "See you at Hurton!" I yelled back to Terry. But he was already driving off.

We paddled down the rain-spattered Swampy. The river was overflowing its banks, sending streams of water

into the forested bottomland on either side. Night was just around the next bend when we spotted the nearest thing we'd seen to high ground—a sodden riverbank on the right. Here would have to be our first night's camp.

Pitching a rain fly on the highest part of the bank, we got a fire going under it, cooked and ate supper. Then I darted out with a flashlight to check the river level. In one hour the river had climbed about an inch up the bank. Knowing that night would last another 10 hours, and judging our camp to be about 2 feet above the present water level, I figured that by dawn we'd still have a foot or so of bank left between us and the river.

Just in case my figuring was wrong, we packed everything but our sleeping bags back into the canoe. If the river reached us, we planned to tie the boat beneath the rain fly, then get in it and float there until light. All night the rain fell, and we dozed fretfully, from time to time shining a light out into the dark to check on the advancing current.

At daybreak we discovered that the rising river had turned our campsite into an island, with the current flowing past us on both sides. Setting off in a downpour, we spent the day squeezing the boat between glistening tree trunks and limboing our way under low, dripping branches, wiping wet tendrils of Spanish moss from our faces. The only animals we saw were wood ducks, which had gathered in the bottomlands to feed on acorns. Around every bend we flushed dozens of them before us. And still it rained.

We found a higher point for our second night's camp—about 5 feet above the current. But even so, by the next morning, as the rain continued, I had to paddle to some of the trees that I had walked to the night before to untie the rain fly's ropes.

That third day the Swampy inundated the low grounds for a half mile on either side, and we simply boated through the forest.

Except for wood ducks, I didn't expect to see any wildlife, in part because of the flood, but also because of a "system" Len had developed to keep his cold from going to his lungs. Every few minutes he would give four

explosive coughs—loud enough to be heard half a mile away. Following the coughs he'd give a mighty spit into the river. Then he'd lean over the side of the boat and vigorously blow out his nostrils, first one, then the other. Because I was in the stern, I got rained on every few minutes by more than just clouds.

But even with all Len's noises, that third day we saw an alligator, several beavers and two turkeys perched in a tree. We also sent a herd of deer splashing off through the swamp. Besides seeing the animals, we came on a giant bald cypress rising massively above the flood. We measured its trunk to be 37 feet around; and by probing with our paddles, we determined that some of its "knees"—their tips just sticking up out of the water—were 7 feet tall.

It was drizzling when we reached Hurton late that afternoon. Len was coughing, spitting and blowing. Terry was not in sight.

Hurton turned out to be little more than a county bridge across the river, with a dozen fishing shacks lined up on one bank—most of them now flooded. We didn't see anyone, but there was a rusty Chevy pickup parked on the roadside, with a Confederate-flag bumper sticker on its tailgate. And from one of the shacks came the muffled throbs of country music. This shack, painted a faded pink, stood on posts, and the river swirled around it just below the floor. Flood or not, someone was in there.

Suddenly the music grew loud, as the door of the shack opened, and we saw a shirtless young man walk out onto the porch carrying a rifle. He snapped the rifle to his shoulder, aimed at the river and fired—BAM! BAM! BAM! BAM! BAM! The gunshots were the loudest things I'd heard in three days, besides Len's coughs, and they made me jump. The man turned and walked back inside, pulling the door shut behind him, muffling the music again. "What was that all about?" Len asked, blowing out his left nostril. I had no idea and didn't feel like paddling over to find out.

We unpacked the canoe, then stood on the roadbank waiting for Terry. From time to time a pickup passed. The driver would slow down, look at the river, nod at us and drive on. Then a black Toyota pickup pulled over, and a slender, middle-aged man got out, saying, "The river's already higher than the TV predicted, and it's still got rising to do!" His name was Minus, and he said he'd lived near the Swampy all his life.

Just then the door of the pink shack opened, the young man walked out and—BAM! BAM! BAM! BAM! BAM! —shot at the river. "That's Moccasin," Minus told us, watching the young man go back inside. "His girlfriend must've left him again."

Minus turned out to know almost everything about the river and its inhabitants. We asked him about a posted campsite we'd seen the day before, and he said it was owned by an old woman named Belle. "Some folks who've tried to trespass there will tell you Belle's crazy," Minus said, "but she ain't crazy; she's just particular about who camps on her land."

Minus laughed and said, "Here's the kind of woman she is: Once I was boating up the river past that spot when I saw Belle sitting there fishing. I came back down about two hours later, and she was still there. So I coasted over and said, 'Miss Belle, ain't you afraid to be way out here in this swamp all by yourself?' Well, she reached down inside her coat and pulled out a .44 Magnum pistol, with a barrel about this long." Minus spread his hands apart as if he were showing the length of a fish: "She pointed that pistol at a tree and... KAPOW! Then she looked at me and said, 'No, I ain't scared, are *you*?'"

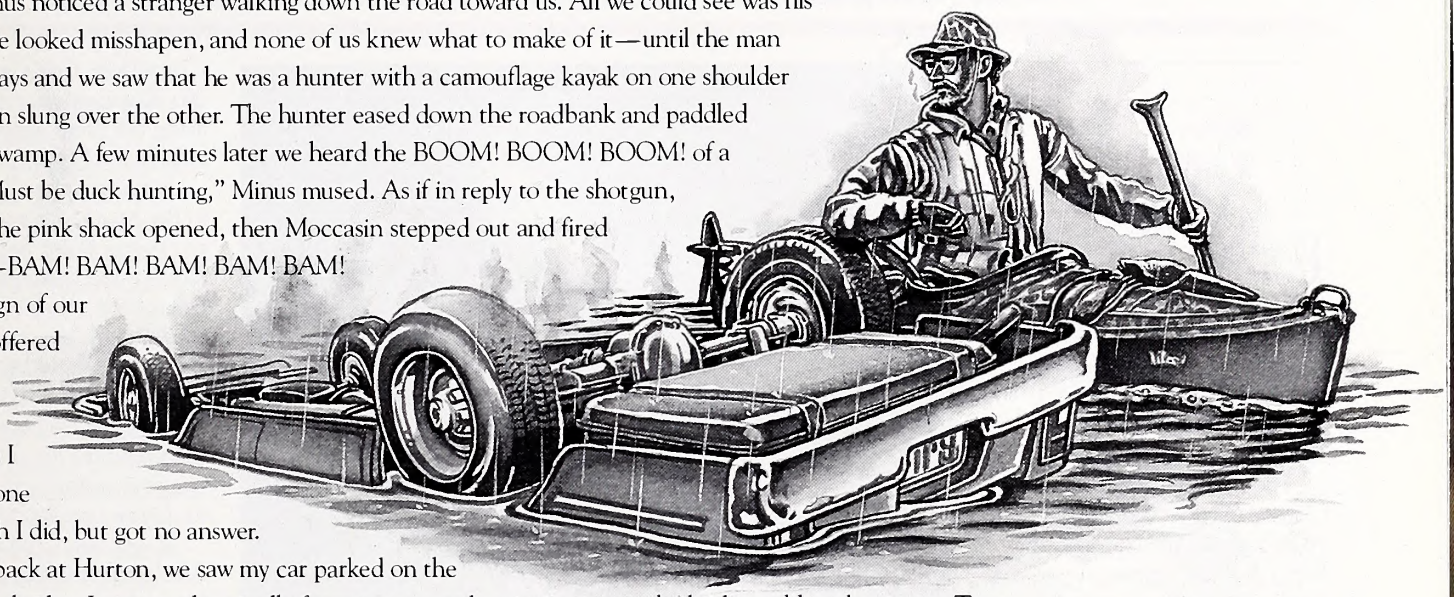
Minus had started another story about Belle when a Ford pickup with a man and woman inside pulled halfway off the road beside us and parked. "That's Cato and his wife," Minus said. Cato, a heavyset man in his fifties, got out to look at the shacks. He said he had a cabin about a mile downriver, near a place called the Bull Hole, and the river had probably flooded it too. Minus explained that the Bull Hole was a bend in the river where the current forms a whirlpool. He recalled that a young "bull" named Johnny went skinny-dipping there once on a full-moon night with his girlfriend, and in the excitement of the moment got sucked into the whirlpool and drowned.

Our conversation circled back to Moccasin, who had emerged for the third time to shoot the river. Just then a battered gray Oldsmobile rounded a curve and roared down the road toward us, veering drunkenly from side to side. Minus, Cato, Len and I took one look at the oncoming car and scattered like a flock of quail. While leaping down the roadbank, I saw out the corner of my eye Cato's wife, waiting in the truck, slide out of sight to the floorboard. Somehow the Oldsmobile missed Cato's truck and wife, missed us,

lurched back into its lane to avoid an oncoming car, scraped the bridge railing, then straightened up. It sped full throttle across the bridge and out of sight around a far curve.

We reassembled with something new to talk about. And a few minutes later Cato's wife came back into view above the dash.

Then Minus noticed a stranger walking down the road toward us. All we could see was his silhouette. He looked misshapen, and none of us knew what to make of it—until the man turned sideways and we saw that he was a hunter with a camouflage kayak on one shoulder and a shotgun slung over the other. The hunter eased down the roadbank and paddled off into the swamp. A few minutes later we heard the BOOM! BOOM! BOOM! of a 12-gauge. "Must be duck hunting," Minus mused. As if in reply to the shotgun, the door of the pink shack opened, then Moccasin stepped out and fired at the river—BAM! BAM! BAM! BAM! BAM!



Still no sign of our ride. Minus offered to drive me to a friend's house, where I could telephone Terry—which I did, but got no answer.

Arriving back at Hurton, we saw my car parked on the far side of the bridge. Len waved excitedly for us to stop and, pointing across the bridge, told us that just as Terry had driven up, the gray Oldsmobile had come speeding back around the far curve, only to roll over several times and flip into the river. We hurried across the bridge and saw Terry trying to pull a stocky man out of the river. The man was soaking wet, and his forehead was gashed. Behind him lay the Olds, upside down, its four wheels sticking out of the current.

The three of us joined Terry and struggled to pull the driver up the bank. But the driver, to judge by the Gold Crown smell of his breath, had swallowed a lot more than river water, and he was more interested in trying to explain why he had wrecked than in helping us rescue him. He told Terry that a bush had run out in front of him and caused him to wreck. He told Len it was a dog that had run into the road. Then he told me it was "just somethin'." He told Terry that he'd kicked out the front window and escaped. He told Len that he'd rolled down the side window and swum out.

We sat the man, whose name was James, in my car and turned on the heater. I got in to bandage his cuts. James wanted to know if the sheriff was coming. Then he turned toward me and announced that he was going to tell the truth. Yes, he said, he'd "been coming back from the liquor store" when he wrecked, but no, he hadn't drunk "no big fifth of whiskey there—just one of them little bottles." James did not mention how much he'd drunk on his way *to* the liquor store, and I decided not to ask.

The sheriff drove up, blue lights flashing; the rescue truck drove up, red lights flashing; and the tow truck drove up, orange lights flashing, along with a dozen pickups, as word of the wreck spread. While the EMTs were strapping James to a stretcher, I saw the duck hunter paddle back out of the swamp. He had two ducks draped like saddlebags across his kayak, their legs tied in the middle. The hunter glided up to the Olds and propped his elbow on one of its wheels. He fished out a cigarette, lit it and, while watching the excitement, smoked contentedly.

About an hour later—hunter gone, James gone, sheriff gone, tow truck and Olds gone, but with the sky still drizzling—Len, Terry and I loaded up the canoe and said goodbye to Minus. We were pulling away when the door of the pink shack opened and Moccasin walked out with his rifle.

"All this shooting's starting to get on my nerves," Len said, rolling down the window to spit. ⊠

This story is true, but the names of places and those involved have been changed for reasons that will be apparent to readers.

Burt Kornegay is a professional wilderness outfitter and guide who runs Slickrock Expeditions in Cullowhee, N.C.

Trapping Project Will Test Feasibility

Wildlife Biologists Team Up to Relocate Eastern Fox Squirrels

Written and Edited by Rodney Foushee

Eastern fox squirrels, larger and more colorful relatives of the gray squirrels in your yard, are coming to Cherry Point Marine Corps Air Station thanks to a pilot project to restore this prestigious small mammal to its native habitat.

The N.C. Wildlife Resources Commission and the Cherry Point Department of Natural Resources are teaming up to trap and relocate the game animals from existing populations.

Fox squirrels are generally common throughout areas of the central Appalachian and Midwestern states, but the eastern subspecies, which inhabits the Southeastern Coastal Plain, has become restricted to isolated pockets through widespread loss of mature pine/oak forests with open understories. Such habitat degradation has been caused mainly from unrestricted logging in the early 20th century and a lack of controlled burning over the past 50 years.

However, in some areas, suitable habitat has redeveloped in recent years thanks to forest management programs that mimic natural conditions. But because existing squirrel populations are so isolated, fox squirrels have not moved back in to reclaim their traditional haunts. These areas, starting with Cherry Point, are where biologists hope to lend nature a helping hand to restore the species.

"From all indications there should be fox squirrels here," said Mark Jones, the Wildlife Commission's assistant small game project leader. "The goal of the project is to test the feasibility of restoring fox squirrels to such suitable habitat."

TERRY SHANKLE

***Eastern fox squirrels** have become restricted to isolated pockets through widespread loss of mature forests with open understories. State and federal wildlife biologists are teaming up to test the feasibility of relocating the squirrels to restored habitats in eastern North Carolina.*

With money, equipment and materials from Cherry Point, state and federal biologists built 175 nesting boxes. Biologists installed the boxes last fall at several locations where there are existing fox squirrel populations, including Camp Lejeune Marine Corps Base, Oak Grove Military Reservation, private lands along the Trent River and Sandhills Game Land.

Fox squirrels will be trapped in the nest boxes and relocated to Cherry Point beginning in January and continuing through this month. Moving the squirrels in nest boxes during the winter months should cause less disturbance for the squirrels and increase the likelihood of moving pregnant females. Each trapped squirrel will be tagged for future population counts.

If successful, the techniques developed at Cherry Point can be used to restore fox squirrels to other suitable areas in the Coastal Plain. One likely future candidate for restocking is Holly Shelter Game Land in Pender County, an area that contains plenty of habitat but few fox squirrels. With luck, Cherry Point will provide one reliable source for eastern fox squirrels that can be restocked in other suitable habitat.

Book Review

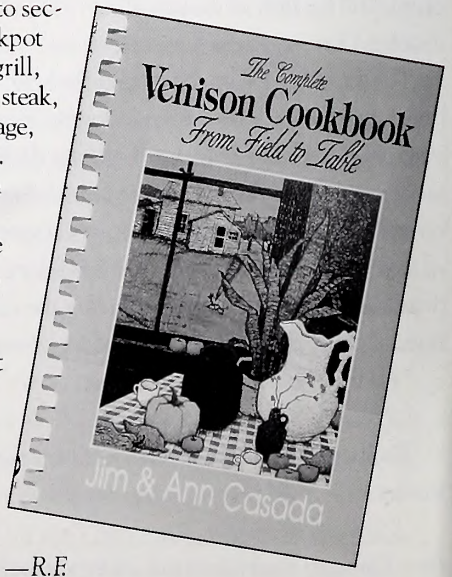
More Than 200 Venison Recipes for All Tastes

The Complete Venison Cookbook from Field to Table *by Jim and Ann Casada, Krause Publications, 700 E. State St., Iola, Wis., 54990-0001, 208 pages, softback, 1996, $12.95.*

If you have a freezer full of deer meat left over from the hunting season, this is the book for you. Consummate outdoor writer and North Carolina native Jim Casada has teamed up with his wife, Ann, to produce the ultimate in kitchen-tested venison recipes.

The easy-to-read, easy-to-follow cookbook features everything from venison casseroles and steaks to venison pizzas and quiches. The cookbook is conveniently broken down into sections on choice cuts, crockpot cookery, venison on the grill, ground venison and cubed steak, soups and stews, and sausage, jerky and little-used parts.

There is even a section with a dozen suggested venison dinners, complete with accompanying fruits, vegetables, drinks and dessert. And as if more than 200 recipes were not enough, this handy book sports a spiral-bound cover to stay open while you prepare even the most elaborate venison dishes.



—R.F.

Wildlife Online

Wildlife Resources Commission Launches Web Site

Looking for some wild entertainment, or maybe just some information?

Join deer, waterfowl, fish and much more on the N.C. Wildlife Resources Commission's new online web site. Loaded with information for educators, sportsmen and wildlife enthusiasts, the new site is designed to meet the needs of a variety of computer users.

Leading the way, the Commission's Division of Conservation Education launched its web pages in December. These colorful pages feature information on the Commission's wildlife education programs, *Wildlife in North Carolina* magazine and products available from the N.C. Wild Store.

Included are indexes for the past three years of the magazine, sample articles and photographs, education workshop schedules, order forms and links to related natural resources sites. Informative trail markers keep even the novice web browser from getting lost in these pages.

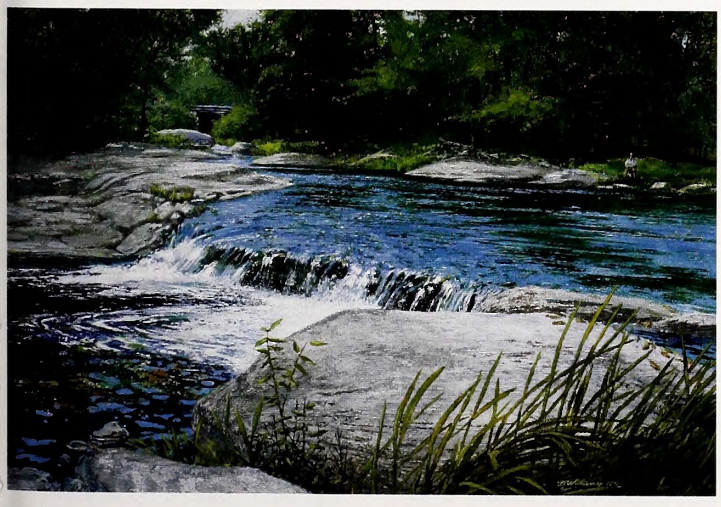
Other Wildlife Commission web pages with links, including those for law enforcement, boating, wildlife management and administration, will soon follow. Detailed maps of game lands and boating access areas maintained by the Wildlife Commission as well as complete hunting, fishing and trapping regulations are just some of the possibilities for the near future.

In the meantime, check out Wildlife Online at http://www.sips.state.nc.us/Wildlife/ConservationEd/ and watch us grow.

ILLUSTRATED BY JACKIE PITTMAN

Falls of the Neuse *by David Williams*

Federation Offers Limited-Edition Print



The Falls of the Neuse River *features the rocky outcrops of the river at the fall line in Wake County. Raleigh artist David Williams brings to life this peaceful scene in this limited-edition print available through the N.C. Wildlife Federation, P.O. Box 10626, Raleigh, N.C. 27605, or call (919) 833-1923.*

North Carolina

Complete Coverage Topo Maps Available

Whether your recreation is hunting, fishing, hiking, bird watching or boating, good maps are a necessity for success and safety in the outdoors. But finding the maps you need locally, especially topographical maps, isn't always easy.

Thankfully, the North Carolina Geological Survey stocks complete state coverage of the following topo maps: 7.5 minute (1:24,000 scale); 30 minute (1:100,000 scale); and 2 degree (1:250,000 scale), all at $4 per map. In addition to topo maps and orthophoto quadrangles, there is also a wide selection of geological publications available, many pertaining to recreational geology.

The Geological Survey promises same-day shipping if the order is received early in the day. The 7.5 minute topo maps have proven very popular with outdoor enthusiasts.

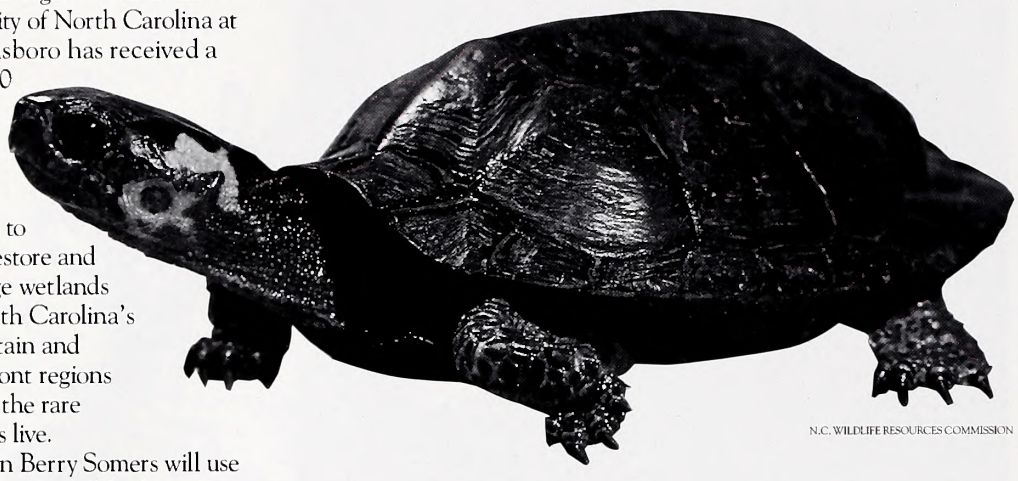
All in-state sales are subject to a 6 percent sales tax. Call, write or contact the Survey's new web page for a publication list and current shipping and handling charges.

To order or request more information, call (919) 733-2423 or write the N.C.G.S. at P.O. Box 27687, Raleigh, N.C., 27611-7687. Orders may also be faxed to (919) 733-0900. Both MasterCard and VISA are accepted. For Internet surfers, the Survey can be reached at http://www.ehnr.state.nc./EHNR/DLR/JEFF/rock1.htm on the World Wide Web.

Project Could Save Small Wetlands

Greensboro Researcher Gets $19,900 to Study Bog Turtles

A biologist at the University of North Carolina at Greensboro has received a $19,900 grant to study bog turtles to help restore and manage wetlands in North Carolina's Mountain and Piedmont regions where the rare reptiles live.



N.C. WILDLIFE RESOURCES COMMISSION

***The bog turtle is** one of about 90 rare, threatened or endangered animals and plants that live in spring-fed Mountain and Piedmont wetlands.*

Ann Berry Somers will use the grant from Pilot View Resource Conservation & Development Corp. to collect data and conduct basic research on bog turtles at various sites in the state. The bog turtle, North America's smallest and most elusive turtle, has declined seriously in numbers in recent decades due to habitat loss.

The bog turtle is among about 90 rare, threatened or endangered species of animals and plants that live in spring-fed Mountain and Piedmont wetlands including meadow bogs. These small wetlands, many of which are less than an acre in size, are being lost because they are not protected by any wetland regulations. The North Carolina Natural Heritage Program estimates the state once had 5,000 acres of these wetlands. Today, only about 500 acres remain.

The information from the bog turtle study will ultimately be used to develop management guidelines to protect small wetland areas. Somers, who teaches biology and conservation, was recently named to the N.C. Wildlife Resources Commission's Nongame Advisory Committee.

—Information courtesy of UNC Greensboro

Bowhunting

Youth Bags Double Bucks

Dear Wildlife,

On Sept. 14, 1996, while my husband was at work, I decided to take our 11-year-old son, Phil, bow hunting. This was the first year he was able to draw the minimum 45 pounds of pull required to hunt.

We had been in our stands about 30 minutes that afternoon when we saw the first few deer, but they were out of range. Then, 45 minutes later a spike buck walked up to the left of Phil's stand. Phil took aim and shot. It was a hit.

The deer ran, but Phil could see the arrow. My son was so excited he looked at me with tears of joy and said "It's a buck! It's a buck!" But Phil decided we should wait to go see the buck up close. About 20 minutes later another deer passed to Phil's right and stopped 12 yards away. Phil shot and missed. But to our surprise the deer ran about 20 yards, stopped and came back to the same spot.

This time Phil was ready and shot again. It was a hit. We had waited about ten minutes when my son whispered "Mom, if I were to kill another one it would be illegal." We left the stands and went to the second deer. It was a young buck. Then we inspected the first deer. Phil was beside himself—Two bucks in one day!

This was a hunt we would remember for the rest of our lives. Talk about a surprised father and husband when we got home. I don't know who he was the proudest of: Phil for taking his first two deer with a bow, or me for taking our son hunting when he could not.

—Gladys Trueblood
Washington, N.C.

Calendar

On occasion, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent four months in advance.

Feb. 12-14

The N.C. Coastal Federation is organizing a National Fisheries Summit to bring together national experts and Tar Heel residents to discuss management strategies for protecting North Carolina's fisheries. The summit will feature more than 30 exhibits and several concerts. It will be held at the McKimmon Center in Raleigh. For registration information, call the federation at (800) 232-6210.

Feb. 14-16

The Southeastern Wildlife Exposition in Charleston, S.C., will feature more than 500 exhibitors and $20 million in wildlife art, decoys and collectibles. For more information, call (803) 723-1748.

Feb. 22

The. N.C. Bowhunters Association will hold its 11th annual Bowhunter Convention and Rendezvous at the Woodlawn Drive Holiday Inn in Charlotte. The event features bowhunting seminars, dealer displays, an awards banquet and an auction. For reservations, call Cathy Gossett at (910) 698-0287.

Feb. 28-March 2

The 17th annual Dixie Deer Classic will be held in the Jim Graham building at the North Carolina State Fairgrounds in Raleigh. The event is one of the nation's largest deer hunting expositions and draws thousands of hunters each year. For more information, call (919) 782-5333.

Richmond County

Commission Leases Fish Hatchery

The N.C. Wildlife Resources Commission's Community Fishing Program has received a big boost with the lease of a federal fish hatchery in Richmond County.

The Wildlife Commission in November approved a 3-year lease of the McKinney Lake National Fish Hatchery near Rockingham. The 422-acre facility, established in the 1930s, includes 23 rearing ponds, a 56-acre lake and about 100 acres of hatchery facilities and roads.

In recent years, the U.S. Fish and Wildlife Service has used the hatchery mostly for producing striped bass. But cutbacks in federal hatchery funding provided the Wildlife Commission with an opportunity to lease the facility. There is a chance the hatchery will be deeded to the state in the future.

"This facility will greatly enhance our Community Fishing Program," said Fred Harris, chief of the Commission's Division of Inland Boating and Fishing. "We will use the rearing ponds to grow channel catfish to the size we want to stock in ponds."

Community Fishing Program ponds are now in Apex, Burlington, Carthage, Charlotte, Concord, Durham, Greensboro, Kernersville, Mooresville, Raleigh, Sanford, Wilson and Winston-Salem. Others will be added this year.

The new hatchery will reduce the distance trucks have to travel to stock ponds and take some of the load off the Watha State Fish Hatchery near Wilmington. Spawning will continue to take place at Watha, but some fry will be transferred to the McKinney Lake facility where they will be grown to about 12 inches, the size needed to stock fishing ponds on a monthly basis during the spring and summer.

Harris estimates the rapidly expanding Community Fishing Program will soon require 200,000 catfish a year. "Rearing of these fish to the size needed requires about two years and will strain the pond space at our Watha hatchery during some seasons," he said. "For that reason, acquiring the lease on McKinney Lake is very good for the Commission."

Though at least one Commission employee will be stationed at the McKinney Lake hatchery, major funding for its operation will continue to be provided by the U.S. Fish and Wildlife Service.

—Bodie McDowell

Field Notes

Bobwhite Quail	Through February 28
Ruffed Grouse	Through Feb. 28
Common Snipe	Through Feb. 28
Crow	See *Regulations Digest*
Rabbit	Through Feb. 28
Raccoon and Opossum	See *Regulations Digest*
Bobcat	See *Regulations Digest*
Snow and Blue Geese	Through Mar. 10

Information on bag limits and other regulations may be found in the *1996-97 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission. For more information on waterfowl limits, call 1-800-675-0263.

The 1997 North Carolina Wildlife Calendar Is Sold Out

Robert B. Dance's "Ira Hudson, Canada Goose" is one of 12 fine paintings featured in the 1997 North Carolina Wildlife Calendar. Order now before they're sold out.

The works of James A. Brooks, Robert B. Dance, Robert C. Flowers, Jr., Bob Herr, David Williams, Denise Nelson, Richard Plasschaert, Duane Raver, and Don Balke are featured in the 1997 Wildlife Calendar.

Order yours today! Payment must accompany your order. Calendar orders may be charged to VISA or MasterCard, or enclose your check or money order (payable to NCWRC). Complete the form below and mail with payment to:

1997 Calendar, N.C. Wildlife Resources Commission
512 N. Salisbury Street, Raleigh, N.C. 27604-1188
(Office is located at 322 Chapanoke Road in Raleigh.)

START YOUR NEW YEAR RIGHT!

Please send me _____ Calendars at $6.00 each . . . . . .$_____

All N.C. residents add $.36 sales tax per calendar . . . . . _____

☐ Enclosed is my check for total payment . . . . .$_____

☐ Charge to MasterCard or VISA _____ dered above. My card number is _____ and the expiration date is _____.

SOLD OUT

_____ | (_____)_____
Card Signature | Day Time Phone No.

If ordering 7 or more calendars, please provide your UPS deliverable address.

Name _____

Address _____

City/State/Zip _____

Phone (_____) _____

All orders must be prepaid. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512). **For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CAL097

Catch Us at These Numbers

1-800-662-7137
to report violations of hunting and fishing laws.

1-800-628-3773
(NC VESSEL) for boat registration and titling.

1-800-675-0263 for hunting dates and shooting hours for migratory game birds.

1-888-248-6834 (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.

1-800-446-8663 (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

November 1996

Principal Balance
$23,264,126.51

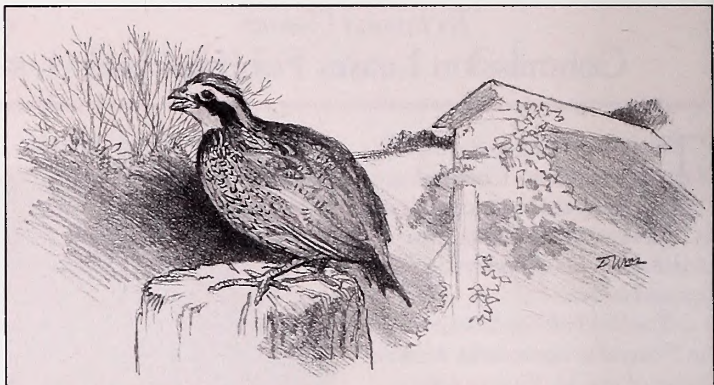
Interest Earned
$21,284,898.18

Total Receipts
$44,549,024.69

Interest Used
$10,049,660.04

Fund Balance
$34,499,364.65

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to Wildlife in North Carolina magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission, programs, the principal remains invested to generate additional interest for the future.



Planting, Pruning, Planning...

by Rodney Foushee

If you want your land to produce plenty of wildlife, now is the time to begin planting, pruning and planning for the coming months.

Planting: While other wildlife food plots should be sowed in warmer months, February is the perfect time to plant annual lespedeza seeds. These handy legumes provide great brood habitat and a winter food supply for quail and other small birds. Annual lespedezas also make good forage for rabbits because of their heavy seed production.

Seeds should be broadcast onto bare spots where the action of late frost combined with spring rains will be just enough to bury them. Tilling and fertilizer are not necessary.

Logging roads, log decks and others clearings are excellent sites for planting lespedeza. But annual lespedezas have a much harder time taking hold in areas with well-established sod or other covers. Average lespedeza seeding rates for wildlife are 10-15 pounds per acre, but a few pounds carried in the back of a hunting jacket will go a long way to improve wildlife production.

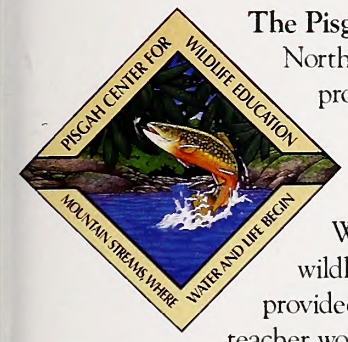
Seeds for both the Korean and Kobe varieties are readily available at most farm feed stores for around a dollar a pound. A list of commercial sources for free wildlife planting materials is available from the N.C. Wildlife Resources Commission, Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C., 27604-1188.

Pruning: February is one of the best months to prune wild fruit trees before they break dormancy in March. Remove any dead, broken or decaying limbs and try to cut back exterior branches so the tree's center gets plenty of sunlight. This will boost fruit production during the growing season; in turn attracting a bounty of wildlife including songbirds, turkeys and deer.

Planning: Late winter is an excellent time to begin making arrangements with cooperating farmers to plant dove fields and other wildlife plantings for later in the year. The key is to make plans with farmers early before the busy planting season gets in full swing. Farmers are much more apt to discuss wildlife planting arrangements relaxing around the woodstove in February.

Wildlife Commission **Spotlight**

Pisgah Center for Wildlife Education



N.C. WILDLIFE RESOURCES COMMISSION

The Pisgah Center for Wildlife Education, located in North Carolina's beautiful mountains near Brevard, provides a wonderful setting in which to help people better understand the natural world and its many interrelationships. It also serves to demonstrate the roles of wildlife enthusiasts and the N.C. Wildlife Resources Commission in conserving wildlife. Though still under development, the center provided interim exhibits, educational programs and teacher workshops for over 100,000 visitors last year.

When complete, the facility will include an interactive exhibit trail, an outdoor classroom, exhibits within the main center building, an educational gift shop, a memorial to employees who have lost their lives while working for the Wildlife Commission, and a demonstration N. C. WILD Education Site.

As with the other activities of the Commission's Division of Conservation Education, the programs of the education center are broad based and dynamic. Emphasis is placed on taking people into the natural world. The center's theme, "Mountain Streams–Where Water and Life Begin," is the overall focus of this public education facility.

The Pisgah Center for Wildlife Education is open from 8 a.m. to 4 p.m. daily, March through November. Group and student tours can be arranged with the center's education specialists by contacting the center at P. O. Box 1600, Pisgah Forest, NC 28768. Phone (704) 877-4423.

Illustrations by David Williams

**********CAR-RT-SORT**C001
WR0001414 LIFE 001 225
DIR DIV OF STATE LIBRARY
ARCHIVES STATE LIB BLDG
109 E JONES ST
RALEIGH NC 27601-2806

Mister Lucky

He's looking good in his bright clothes, the females are giving him the eye and February is the time of year to start a family. It's enough to make this male wood duck feel fortunate. Actually, these native ducks are luckier than they know because their once-meager populations have been restored to all-time highs thanks to years of nesting box programs, habitat enhancement and conservative bag limits.

Periodicals postage paid at
Raleigh, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:61/3

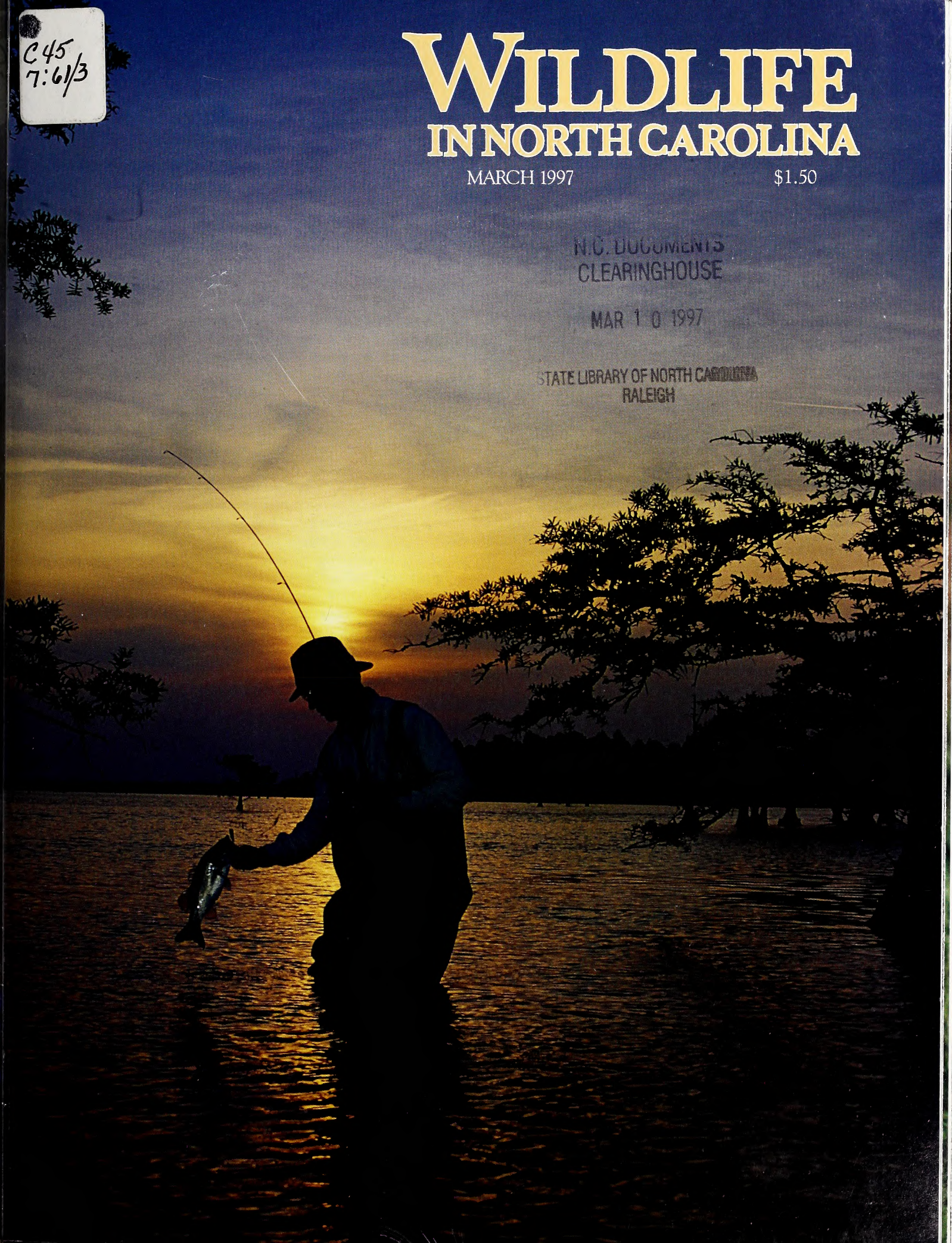
WILDLIFE IN NORTH CAROLINA

MARCH 1997 $1.50

N.C. DOCUMENTS
CLEARINGHOUSE

MAR 1 0 1997

STATE LIBRARY OF NORTH CAROLINA
RALEIGH



The Roanoke's Shad Surprise

by Jim Dean

One cool day last March, Dad and I decided to drive over to Weldon to the boat landing on the Roanoke River just upriver from the old hatchery. It's a sentimental Sunday afternoon sort of thing that's a tradition for many Halifax County families. Everyone parks on the high bluff overlooking the river to contemplate the arrival of the rockfish (striped bass) that will soon gather to spawn along this stretch of river as they have for as long as anyone can remember. The spectating and fishing will peak in April with a river full of boats and last well into May.

ROANOKE SHAD FISHERMEN AT WELDON JIM DEAN

Years ago, Dad and his father and I were more likely to have been in one of the boats, but after my grandfather's death in 1968, our annual trips waned. Even though fishing was often good, the river was a muddy, stinking mess of pulp mill waste covered with foam and thick with a syrupy bacteria that fouled lines and lures and bait. Over the years, however, the Roanoke has been substantially cleaned up, and striper runs that dwindled during the 1970s and '80s are rebuilding.

But it was not rockfish that Dad and I had come to see. To the surprise of old-time river rats, the Roanoke has developed a fantastic run of hickory shad that precedes the spawning run of stripers by a month or more. Dozens of fishermen now line the banks or fish from boats while casting small spoons or lead-head jigs called shad darts—often rigged in tandem—on light spinning tackle. The day we were there, everyone seemed to be catching the acrobatic hickories. Upriver at the Gaston landing just below the Roanoke Rapids dam tailrace, you can find the same scene. What makes this fishery so remarkable is that it apparently didn't exist until recently.

Hickory shad were unheard of in the upper Roanoke 30 years ago. Not that anyone was looking. Hickories may have been spawning there then, but if they were, no one knew it—or admitted knowing it. Certainly, there was no local tradition of sportfishing for hickories and, besides, the river's murk and goo made it impractical to fish tiny jigs and spoons on light monofilament anyway.

For the most part, sportfishing for hickory shad or their larger cousins, the white (American) shad, was something rumored to take place in northern rivers, or in the St. Johns River in Florida. In North Carolina, only a handful of knowledgeable fishermen knew that shad could be caught on artificial lures, and they weren't talking about it. At that time, white shad could be caught at the three locks on the Cape Fear, and also in the Tar River, mostly behind Bob Melton's Barbecue at Rocky Mount. Hickories, and some whites, were also caught in Contentnea, Pitchkettle and Grindle creeks where they flow into the Neuse. Shad fisheries were also developing at a few other local hotspots—Whiteoak, Trent, Chowan and Northeast Cape Fear rivers and at Sparta on the Tar. Throughout the late 1960s and '70s, these fisheries attracted more and more fishermen who loved to catch the leaping hickories that averaged about 1½ pounds, or thrill to the powerful runs of much bigger white shad. But shad fishing was still largely a local phenomenon, and the upper Roanoke's potential had not yet developed.

In the early-'60s when I was stationed at Ft. Holabird in Baltimore, I caught shad fever and joined thousands of anglers fishing the popular spring runs in the tributaries and main stem of the Susquehanna River and also the Rapahannock in northern Virginia. When I returned to North Carolina in 1964, I began to fish the Cape Fear, Tar and Neuse hotspots. I had learned to love shad, and I didn't mind traveling to catch them.

Yet, I had to wonder. If there were hickories or whites in these and other coastal rivers, why wouldn't they be in the Roanoke closer to home? No one I knew around home had ever heard of hickory shad, much less fished for them. But for several years, on visits to my parents in Roanoke Rapids, I gave it a try using a variety of darts and spoons. I fished the right time of year, and I cast from many of the same spots favored today near the Gaston and Weldon boat ramps. I never caught or saw a hickory, although there were plenty of gizzard shad being netted.

Were at least a few hickories always there, even then? Do they now come to the upper Roanoke because the water is cleaner? We will probably never know. But, by golly, they're there now every spring in huge numbers. On peak days, anglers using darts, spoons and even flies sometimes catch a hundred or more a day, and the annual arrival of hickories in the upper Roanoke has become a celebrated rite of spring.

For sure, the state of the river and those silver hordes of hickories would astonish my grandfather.

N.C. DOCUMENTS
CLEARINGHOUSE

MAR 1 0 1997

STATE LIBRARY OF NORTH CAROLINA
RALEIGH

March 1997
Volume 61, Number 3

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

CONTENTS

4 Four Ways for Walleyes
written and photographed by Gerald Almy ©1997
You might not know it, but walleyes are common in some of North Carolina's lakes and rivers. Here's how and when to catch 'em.

10 Get Tough with Your Bow *written by Mike Gaddis* ©1997
illustrated by Jim Brown ©1997
You're less likely to miss that trophy whitetail if your practice sessions duplicate real hunting situations. That's where this 3-D archery event can help.

14 The Crabber's Cadence *written by Eddie Nickens* ©1997
photographed by Melissa McGaw
The next time you bite into a delicious fried softshell or a backfin lump salad, think about Edward Etheridge. He knows about the hard, lonely work that put those blue channel crabs on your table.

20 Bass Pros Talk Spinnerbaits
written and photographed by Soc Clay ©1997
If you follow these tips, you'll learn why the spinnerbait is a favorite lure among the nation's top bass tournament professionals.

24 Eel Excursions *written by David Lee* ©1997
illustrated by Chris Armstrong ©1997
No matter how far inland you find them, eels have one thing in common. They all came, somehow, from the Sargasso Sea.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

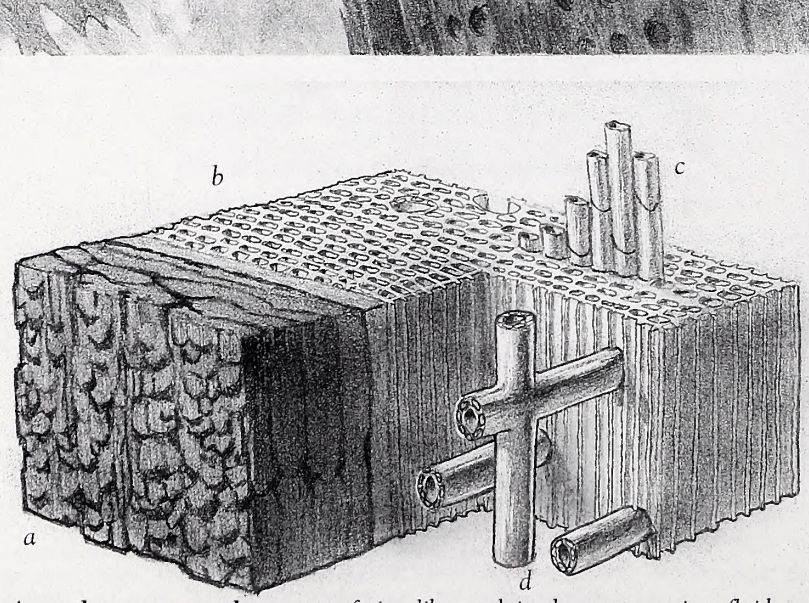
Back of the Book *by Rodney Foushee*

Wildlife Through the Year *by Rodney Foushee*

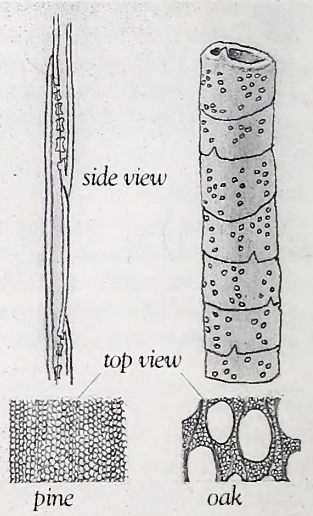
Cover *Bass are on the move this time of year, and so are bass fishermen like this wader at Lake Mattamuskeet. Photographed by F. Eugene Hester.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment only by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

The yellow-bellied sapsucker *is one of several animals that make use of tree sap. In maples, pecans and other trees it drills holes into the sap-conducting pipes leading from the leaves to the roots, and laps up the sugary sap that flows out.*



A tree houses a complex *system of pipe-like conduits that carry various fluids. This cube (above) representing the outer edge of a pine tree shows the bark (a) and the sapwood (b), with the positions of sap-conducting tracheids (c) and resin ducts (d) indicated as well.*



The vessels, *or the squat sap-conducting cells of an oak tree (right), are lengthy and so wide they are often visible to the naked eye. A pine's cells, called tracheids (left), are narrow and short.*

D. Williams

Sap, Resin and Other Tree Fluids

written by Lawrence S. Earley/illustrated by David Williams

Sap rises with the coming of spring. It's an old saying that's only partly true. Sap also falls, and it moves sideways, too. Indeed, inside a tree is a complex plumbing system that circulates several different kinds of substances which are of considerable interest to humans and wildlife.

Sap, of course, is the tree's vital "lifeblood." Thousands of tiny hollow passageways called the xylem conduct mineral-laden water upwards from the roots to the leaves where it is emitted as vapor, a process called transpiration. Meanwhile, the food products of photosynthesis—concentrated sugars and other carbohydrates—pass from the leaf down into the stem and into every living cell in the tree through another system of pipes, the phloem. The substances carried in this two-way circulation system are called sap—xylem sap (or root sap) and phloem sap (or leaf sap).

These sap-conducting pipes, called vessels in hardwood trees, can be very long and wide, and are often visible to the naked eye. In some hardwoods such as oaks and elms they are so long they can run nearly the height of the tree. The large size of these vessels means that sap can move very quickly. The sap velocity of oaks has been measured at almost 200 feet per hour.

On the other hand, pine sap ascends at the sluggish pace of about 2 feet per hour. The reason is that the sap-conducting pipes of conifers, called tracheids, are narrower and shorter than the vessels of the oaks and they are not as continuously hollow. To ascend a pine, the sap must move from tracheid to tracheid, squeezing through tiny openings in the cell walls, a less efficient process than that of the oaks.

Besides sap, another fluid present in trees, and especially in the pines, is resin. Resin is not sap. Resin is a gummy substance manufactured by the tree that moves through a distinct system of interconnecting vertical and horizontal ducts. These resin ducts are really spaces surrounded by living cells that spring into action when one of the ducts is severed, flooding resin to the site of the wound. Resin coats wounds protecting trees from insect attack and other physical injury.

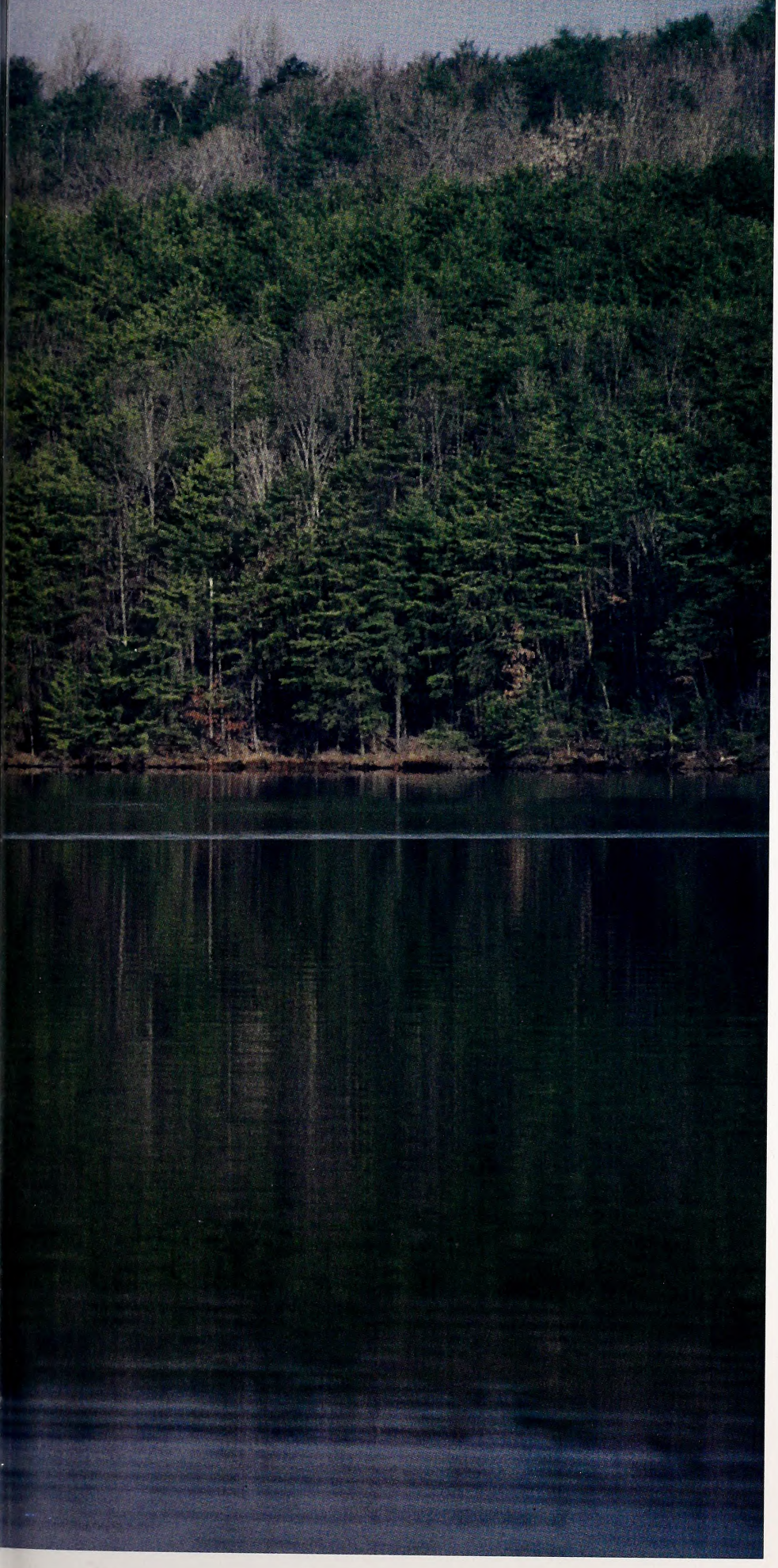
Not surprisingly, several birds and insects have learned to exploit the different properties of sap and resin. The yellow-bellied sapsucker is a woodpecker species well known for drilling large sap holes into the phloem of trees so it can lap up the concentrated sugars inside. Some insects do the same thing, notably the aphids which feed on phloem sap in leaves and branches. The endangered red-cockaded woodpecker has discovered that drilling a series of resin "wells" around the opening of its tree cavity creates a sticky resin barrier that protects it somewhat from the predations of rat snakes.

Humans are no less skilled than other animals at profiting from sap, resins and other tree fluids. The maple syrup we pour on our pancakes is made from the sweetened sap of the sugar maple tree. The sap moved down through the phloem in the fall, was stored in the tree for the winter, and was tapped in the spring for a short period after the sap began to rise.

Pine resin was once a lucrative product of the longleaf pine tree. North Carolina's turpentiners repeatedly wounded the pine with a sharp metal tool from March to November, causing the gummy resin to flow. The captured resin was distilled into two valuable substances, turpentine and rosin.

In more exotic places of the world, still other tree fluids are used to make rubber, which is produced from the milky latex that runs from cuts in the rubber tree, and gum arabic, which derives from the bark of an African tree. Trees are full of useful fluids.

***The word "sap"** can refer to the watery fluid that runs from the roots to the leaves, where it is emitted as vapor, and also the carbohydrates that run from the leaves down to the roots. Both fluids are vital to the tree and are conveyed through very different "pipes." The pipes that carry the root sap are called the tree's xylem. The pipes carrying leaf sap are called phloem.*



Four Ways for Walleyes

You might not know it, but walleyes are common in some of North Carolina's lakes and rivers. Here's how and when to catch 'em.

written and photographed by Gerald Almy ©1997

Dogwoods and redbuds splashed brush strokes of white and pink on the steep hillsides as we probed the shoreline of Fontana Lake with jigs and light spinning tackle. We had picked up several smallmouths so far that spring morning, as well as two chunky white bass.

The next fish that struck at the end of a long, rocky point, though, didn't feel quite the same. For the first few seconds it was simply a deadweight. I thought I'd hung a stick and was pulling it through the water. But then the graphite rod telegraphed a subtle wallowing. There were no jumps, no fast runs, but simply a steady resistance and some slow-motion head shaking. Finally, when I pumped

***Surprising to** some, North Carolina's coldwater lakes offer excellent walleye fishing. Some of the better lakes include Appalachia, Calderwood, Chatuge, Cheoah, Fontana, Gaston, Glenville, Hiwassee, James and Summit.*

the fish up through the clear mountain water, my partner spotted it.

"It's a walleye!" he shouted.

Leaning forward with the net, he quickly scooped the 3 pounder into the boat. The smallmouths had been released, but this big-eyed bronze fish was clipped to a stringer, where it would go into a cooler back at the truck—and the frying pan that night. One thing I knew about walleyes was that they were considered a delicacy.

Like many anglers, my introduction to North Carolina walleyes was an accidental one. We were going after smallmouths, with panfish a secondary target, that morning on Fontana many years ago, but the walleye was a welcome bonus. For several years, these large members of the perch family remained just that—fish that I took accidentally while targeting other species.

Eventually, the challenge of catching these intriguing game fish, and the desire to add more of their succulent, white fillets to the freezer, led me to fish specifically for "marble eyes." Over the years I've settled on four techniques that catch these challenging game fish both here and in northern states and Canada, where walleyes abound.

First, where should you look for walleyes in North Carolina? Some of the better lakes include Appalachia, Calderwood, Chatuge, Cheoah, Fontana, Gaston, Glenville, Hiwassee, James and Summit. Chatuge produced the state record, a fish of 13 pounds, 8 ounces caught by Lamar Cofer in 1986. Walleyes that size are not common in North Carolina, but you can expect fish in the 2-to-5-pound class on a fairly regular basis, and the occasional trophy in the 5-to-10-pound class. Because of the delectable taste of these fish, most anglers keep fish over a foot or so long. There's no minimum size limit.

Other than during their late-winter, early-spring spawning runs in rivers, walleyes tend to concentrate in certain areas of lakes. By starting in these locations you can narrow your search. Look for the fish around river mouths, bars, points, depressions, reefs, humps and sunken islands. Logs, rock walls and weed beds can hold fish, as do sharp drop-offs into river channels. Sandy, rock or gravel bottoms are usually preferred to soft mud. If a breeze is blowing, try the windward side of points, reefs and coves. That's where

***Early spawning** runs in March offer anglers the best chance to take walleyes from the bank. The Little Tennessee River, a tributary of Fontana Lake, usually has good runs depending on weather and water conditions.*

the fish will typically be waiting for baitfish.

Look for these types of cover first on a topo map, then find them in the lake with a depth finder. If you can pinpoint baitfish schools with your locator, that's helpful, since walleyes often orient on forage fish and may actually follow them around like stripers. If you find marks on the depth finder that you think might be walleyes, or a good school of baitfish on prime structure, toss out a marker buoy to pinpoint the location so you can fish it thoroughly, perhaps trying several methods. If you catch fish, mark the spot on your topo or in a notebook for future reference.

Whenever possible, try to fish on cloudy or even drizzly days. Dawn, dusk and after dark are also productive times. You can catch walleyes during the day, but these fish are sensitive to light and often feed particularly well in dim-light conditions. With those guidelines in mind, here are the four tactics I like.

Fishing for Spawning-Run Walleyes

In early spring, usually February and March, as water temperatures rise into the lower 40s, walleyes in many lakes make spawning runs up major tributaries. Not all fish move up these waters, but often enough of them do to make them worth targeting. The fish may migrate several miles or just a few hundred yards, depending on the nature of the feeder river they're ascending.

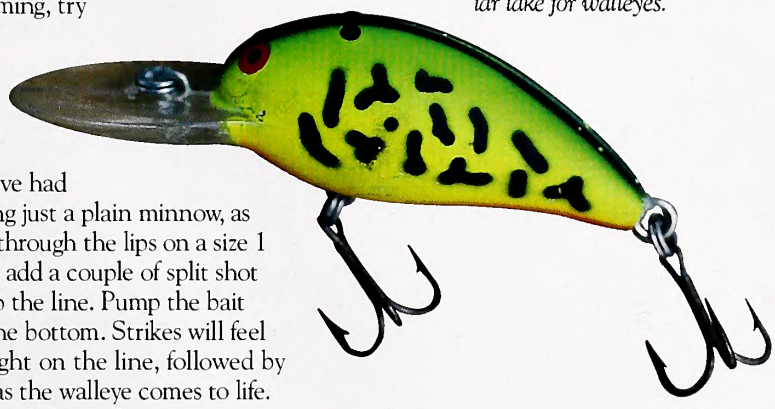
Rapids or dams will often halt the walleyes, concentrating them just downstream in slightly calmer water. The Roanoke River below Kerr Dam (the headwaters of Lake Gaston) is one such location. Though it's technically in Virginia, a reciprocal license agreement allows North Carolina license holders to fish here. Walleyes start concentrating here as early as January. They aren't present in great numbers, but some will weigh 5 pounds or more. Other spawning rivers include the Tuckasegee and Little Tennessee, tributaries of Fontana Lake. The Little Tennessee has enjoyed a traditionally good run and some fine fishing for many years. The Linville River also attracts spawning walleyes from Lake James, but it's closed from the mouth upstream to the Route 126 bridge. Above that fishing is open, but there's a reduced daily limit of four fish.

The favorite method for catching these spawning-run walleyes is casting jigs. Marabou or bucktail dressings are useful in white, yellow or chartreuse. Sizes can range from 1/8 to 1/2 ounce, depending on the current and depth. Both plain jigs and those dressed with a pork rind strip or plastic twister tail will produce. Another good option is a 3-inch, 1/4-ounce Sassy Shad. Cast these jigs out and across or slightly upstream, let them sink near the bottom, then reel back slowly and steadily, with an occasional pause or slow lift of the rod a few inches.

You'll lose a few jigs on the bottom, so bring plenty of replacements. If strikes are slow in coming, try adding a live minnow or night crawler dressing.

At times I've had good luck using just a plain minnow, as well. Hook it through the lips on a size 1 to 4 hook and add a couple of split shot a foot or so up the line. Pump the bait slowly along the bottom. Strikes will feel like extra weight on the line, followed by slow bucking as the walleye comes to life.

Another good choice for spawning-run walleyes is a countdown Rapala, or floating/diving crankbait such as the Shad Rap, Storm ThinFin, Bomber Model A, Cordell Wally Diver or similar model. Alternately, you can use a small, 2 1/2- to 3 1/2-inch floating Rapala or Rebel with weight to take it deep. Tie the lure onto an 18-inch leader off a three-way swivel with a few split shot trailing on a short, 6-inch dropper leader fastened to the third eyelet. If you hang up, you'll likely lose only the split shot and not the expensive lure. Work these plugs slowly and steadily, close to the bottom.



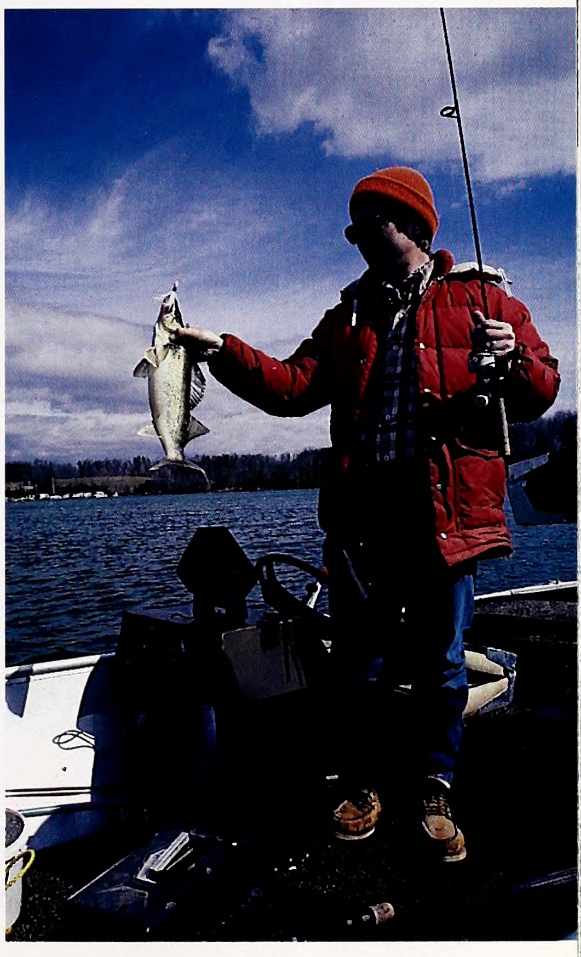
Trolling deep-running *crankbaits is a good way to probe an unfamiliar lake for walleyes.*

Trolling with Crankbaits

If you're just getting into walleye fishing or are checking out a new lake, this is a great way to get to know the water—and hopefully catch a few fish. Trolling keeps your lure down in the productive strike zone almost continuously, increasing the odds of finding fish and drawing a strike. Study the topo map and use the depth finder as you troll to stay over good structure and hopefully baitfish or game fish, as well. Work a contour line or troll in a lazy-S pattern near the edge of reefs, points or drop-offs, keeping the plug constantly wiggling through the level where you think you may find fish.

For some situations, simply trolling a crankbait on 8- to 14-pound test line is the way to go. Choose your lure according to the depth of water you're probing. Some of my favorites for this "flat-line" trolling include the Shad Rap, Rebel D.D. Shad, Storm Hot 'n' Tot, Lindy Deep Baitfish, Poe's Dead Eye, Bomber Model A, Storm Wiggle Wart and Cordell Wally Diver.

If walleyes are in shallow water and are skittish, use a side planer board to carry the crankbait 40 to 60 feet away from the noise and shadow of the boat. These planers also

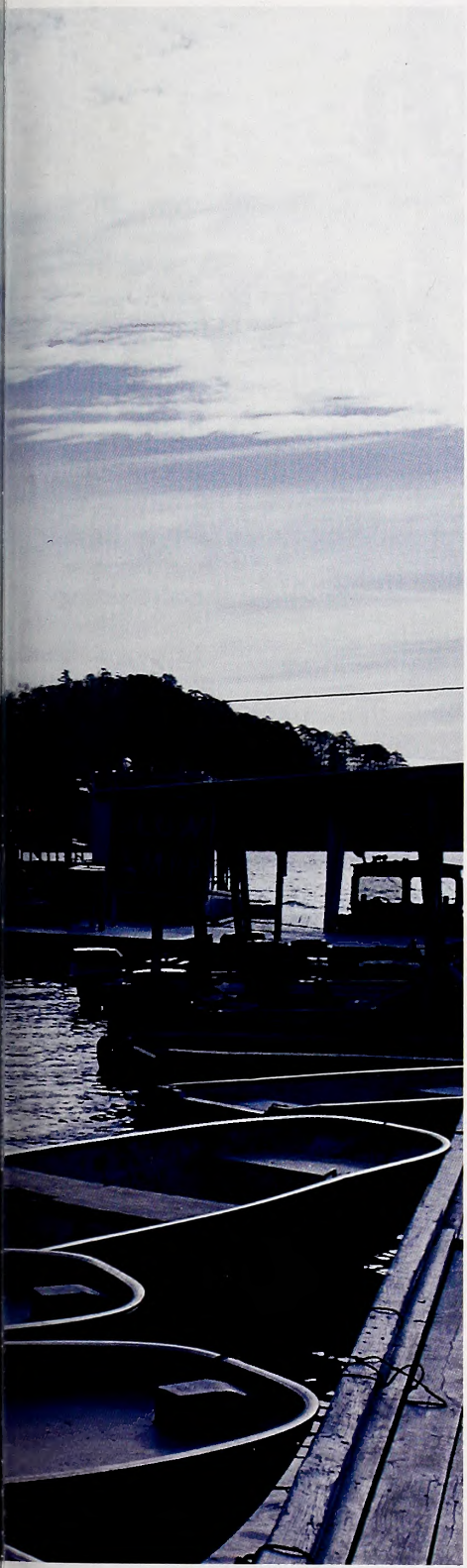


The author shows *a fine walleye taken from Lake Gaston. The Piedmont lake has a walleye fishery that co-exists with stripers and offers excellent "eye" fishing if the species is targeted properly.*

***Fontana Lake,** with its deep waters and extensive spawning rivers, is considered one of the best walleye spots in the state.*

let you cover a wider swath, with some offerings pulled behind the boat while others are carried off to the side.

It's a good idea to spend some time probing in moderate depths after the spawn in April and part of May, but walleyes typically head to deeper water after that. The best way to reach them deep when trolling is to use a downrigger. This device consists of a wire line or a cable rigged with a 6- to 10-pound cannonball- or torpedo-shaped weight that holds your lure at exactly the depth you choose, after you've selected the level on the counter. Your lure and line are hooked to the weight, and when a fish strikes, the line pops free from its release. Then, you can fight the walleye unencumbered on light tackle. If fish aren't spooky, you can run the lure 10 to 40 feet behind the cannonball, but if they're skittish, run it 75 to 100 feet back.



Sometimes walleyes are tentative biters and do not snap the clips or releases well. If that proves to be a problem, switch to thin rubber bands instead of clips. Simply half-hitch one end of the rubber band on the downrigger cable or a snap swivel just up from the ball and attach the other end to the line. Walleyes will usually snap the thin rubber band. Even if they don't, you can see the rod throbbing and can lift it out of the holder and pop the rubber band yourself when you set the hook.

The same crankbaits listed above work well on downriggers, but thin minnow plugs are also good choices. Bomber Long A's, Rapalas, Rebels, Storm Thundersticks, Cordell Redfins and Lindy Shadlings in lengths from 3 to 5 inches all work well. Stock a variety of brands in blue, green, black/silver and fire-tiger finishes. (With any of these lures, be sure to calculate how much deeper the plug will run on its own when setting the downrigger counter. For example, if a plug dives 5 feet and you think the walleyes are at 40 feet, set the downrigger at 35 feet.)

If you don't want to invest in downriggers, lead-core line or diving planes such as the Luhr-Jensen Pink Lady are good options. These will take the small crankbaits and minnow plugs down to the strike zone during summer—often from 25 to 50 feet.

Drift Fishing with Bait

If you took a poll of walleye anglers across North America, this tactic would easily be rated number one—and for good reason. It presents live offerings—which walleyes find nearly irresistible—in a slow, lifelike manner that allows the walleye plenty of time to catch the bait and be solidly hooked.

On lakes, this method is good on any of the types of structure discussed earlier, particularly points, reefs, bars and edges of drop-offs along a river or major creek channel. It also produces on slow sections of rivers. A Lindy Rig or some similar version is the best setup. This consists of a specially designed "walking" sinker that threads on the main line above a swivel, followed by a leader and small hook with the bait on it. Leader length can vary from 2 to 6 feet. Most useful sinker weights range from 1/4 to 1 1/2 ounces. The bait should be a minnow, night crawler or leech.

To improve this setup, sometimes I'll use a floating jighead such as the Rattling Bandit or Floating Bandit by System Tackle to suspend the bait off the bottom. This reduces the chances of snagging on brush or rocks, and it puts the bait up where it's more visible to fish. You can also buy rigs with a small float threaded on the leader—yet separated from the hook—to suspend the bait. Another way to suspend night crawlers is to use a worm blower (syringe) to inject air into the bait.

Use this rig for drift fishing if the wind is blowing across prime waters at just the right speed (about 5 to 10 mph). If winds are calm or too strong, most walleye experts use a technique called back-trolling. This simply means running your electric motor with the boat pointed backward to slow your progress and allow more precise boat control. It presents the bait so it's barely moving—just the way walleyes prefer it.

To be sure the sinker maintains bottom contact, you can even shift into neutral or turn off the motor every now and then to allow the offering to pause. This often triggers a strike. If you hook into a walleye, toss out a marker buoy so you can drift or troll through the same area again or try casting jigs.

If you don't want to use Lindy Rigs, an alternative for presenting bait is to simply tip small, colorful jigs with minnows or night crawlers. Use a heavy enough offering so that the bait stays on the bottom and jig it ever so slightly every 20 or 30 seconds.

Vertical Jigging

This may be the least-known tactic for North Carolina walleyes, but it's often the most effective. The most popular lure for this fishing is a 1/2- or 3/4-ounce Hopkins Shorty spoon with a nickel or gold finish. Other good brands include the Fish World 3-D Photo Spoon, Rocker Minnow, Knocker Minnow, Bomber Slab Spoon, Bass Pro Strata and Luhr-Jensen Crippled Herring. Also good are special walleye jigs such as the Slo-Poke, Walleye Wobble, Fuzz-E-Grub, Air-Plane Jig, Poc-It-Hopper, T-Tot Minnow, Foxee Jig and Rattlin' Shortcake. These jigs can be fished by themselves or tipped with a small minnow or small piece of night crawler. Spoons work best without any additions.

Vertical jigging is best when walleyes are at depths of 15 to 60 feet—meaning primarily summer and winter. Position your boat directly over the structure or a spot where you've located fish on the depth finder. Then lower the spoon or jig to the appropriate depth—either at or just above where you expect fish to be. Pump the rod up sharply 6 to 24 inches, then lower it down just fast enough so the lure falls freely, but no slack forms in the line.

Strikes usually occur on the drop, so you don't want to lower the rod tip too quickly or you'll miss the delicate takes. Sometimes you may feel a slight tick or thump. At other times the line may simply stop falling or veer sideways. If anything looks or feels out of the ordinary, set the hook. After you've covered an area thoroughly, move to another location.

Whether you fish spawning runs, troll, drift with bait or jig vertically, don't overlook this unique North Carolina game fish. Walleyes may not be as common or as easy to catch as bass or bluegills, but that makes them a special challenge. And when you sink your fork into a forkful of fried walleye drenched in butter and lemon juice, you'll know the effort was well worthwhile. ⊠

Get Tough with Your Bow

You're less likely to miss that trophy whitetail if your practice sessions duplicate real hunting situations. That's where this 3-D archery event can help.

written by Mike Gaddis ©1997 / illustrated by Jim Brown ©1997

On an October afternoon in 1993, Wanda Peeples of Oak Ridge was sitting in a tree stand when she suddenly found herself confronted with a dilemma. It should happen to us all.

A slight stir of leaves wrenched her attention to a tight line of understory saplings. Straining her eyes through the autumn foliage, she could see hues and curves that were familiar, but strangely disordered, like pieces of a puzzle. Then she made out the form and presence, and a glint of antler. Twenty yards out and parallel, the deer kept walking, refusing her unspoken pleas to stop. Her hopes began to falter as it turned broadside, still presenting no acceptable bow shot in the heavy cover. Then, the odds inexplicably shifted. Turning into a slow arc around the stand, the buck slowed and finally stopped, almost totally obscured by the thick, leafy cover of a dogwood tree.

Wanda could discern enough of the backlit body profile to locate the buck's vital area. Beyond that, prospects were girdled by a confusion of limbs, twigs and leaves. One small limb fork, partially screened by foreground leaves, offered the slimmest of possibilities. Mind racing against the strangling constriction of time, she considered both probability and ethics. Later, she would reflect on the pressure: "I was thinking if he hasn't stopped before now, he won't again. I debated a moment longer and decided to shoot. I picked the shot, went through my regimen, and released. It felt and sounded true."

True it was! The result was a magnificent Piedmont buck which dry-scored 149.125 points, bestowing on Wanda distinction as the first woman to enter a North Carolina whitetail into the prestigious Pope & Young Club record book. Her buck currently ranks fifth among North Carolina's all-time largest bow-killed deer.

Granted, P&Y typicals come sparsely, and under the circumstances Wanda was fortunate. A certain amount of luck accompanies any trophy deer triumph. However, the fact remains that very few bowhunters could have successfully threaded the needle for that shot. The credit that must be accorded Wanda Peeples is that, to a good extent, she had pre-programmed the outcome. Wanda is an avid and formidable 3-D tournament archer. This was the pivotal element in her decision to shoot that celebrated October afternoon.

"That shot was hard, and the last thing I want to do is cripple a deer," she observed, "but I shoot a lot of tough-man contests. So, I thought to myself, I'll just have to shoot it through the leaves, like a tough man."

Tough-man contests, popular sideline events at many 3-D meets, emphasize pinpoint arrow placement in thick cover. In a typical round, each contestant is allowed a single arrow to complete a five-target McKenzie course for total score, forfeiting if the arrow is lost or damaged beyond use. Innovative shooting form, shot choice, concentration and control are exceedingly critical in driving an arrow into the 10 ring.

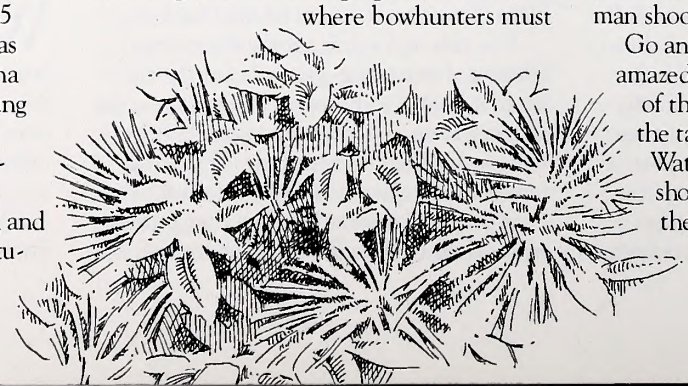
While the competitive circuit version is often extreme, the concept can be transported to home practice with great benefits for bowhunters, as Wanda's fine buck attests. Trophy animals spend the majority of legal shooting hours in or edging dense cover, where bowhunters must defy intervening limbs, trees, leaves or vines. Big deer have a sixth sense about shooting lanes, and the only chance at a lifetime trophy may come outside their corridor of assurance. When cover is heavy, deer can appear suddenly, creating tense shooting situations with minimal latitude for movement. Trying to stand in the immediate presence of a good buck is a fool's game. Paradoxically, most bowhunters spend their summer practice shooting from a standing position in the backyard, where the greatest deterrent to arrow placement is the clothesline.

Tough-man exercises serve bowhunting skills better by replicating actual shooting opportunities, and performance-planning success. If you can muster the mettle for this "Paris Island of bowhunting practice," you will be the best you can be. Come bowhunting season, you'll be riding a confidence high you never thought possible. Here's how:

If possible, visit and observe an actual "tough man" shoot.

A few hours at an actual meet on a nice spring afternoon will offer additional insight about the concept and how to duplicate it at home. 3-D archery events are held in North Carolina almost every spring and summer weekend starting in late February. Once the foliage has fully emerged, check with a local pro shop for dates and times of events near you, and verify that a tough-man shoot is on the agenda.

Go and observe. I promise you will be amazed. You'll quickly discover that one of the biggest problems is simply finding the target in the muddled undergrowth. Watch the contestants jockey around shooting stakes for a line of sight. Note the unorthodox shooting positions. Feel the concentration that pre-



cedes a release. Listen to the arrow snip leaves and clip twigs on its way to the target and for the solid thud that signals a hit. While you'll also hear the whack and warp of a misdirected shaft, you'll learn that a good shooter can put most arrows through to the small scoring circle.

Obtain access to a small, safe woodlot.

Dig in. Choose woods offering a profusion of third-growth trees and understory saplings, only a bit less dense than the thicket around your stand, *before* you cut shooting lanes. The size and location of the chosen block should be primarily dictated by safety considerations. Public parks, roadside sites or other well-frequented areas are obviously unsafe. Misplaced, high-velocity arrows glancing off limbs take wild hops and lateral zings. While the requisite cover usually stops an errant shaft within a few yards, make adequate allowances for downrange and sideline improbabilities.

Uneven, inclining or declining terrain is *preferred*, and the chosen area should afford several different shooting arrangements at a range of 15 to 25 yards. Finally, locate close enough to home to encourage one or two tough-man sessions per week, July thru August.

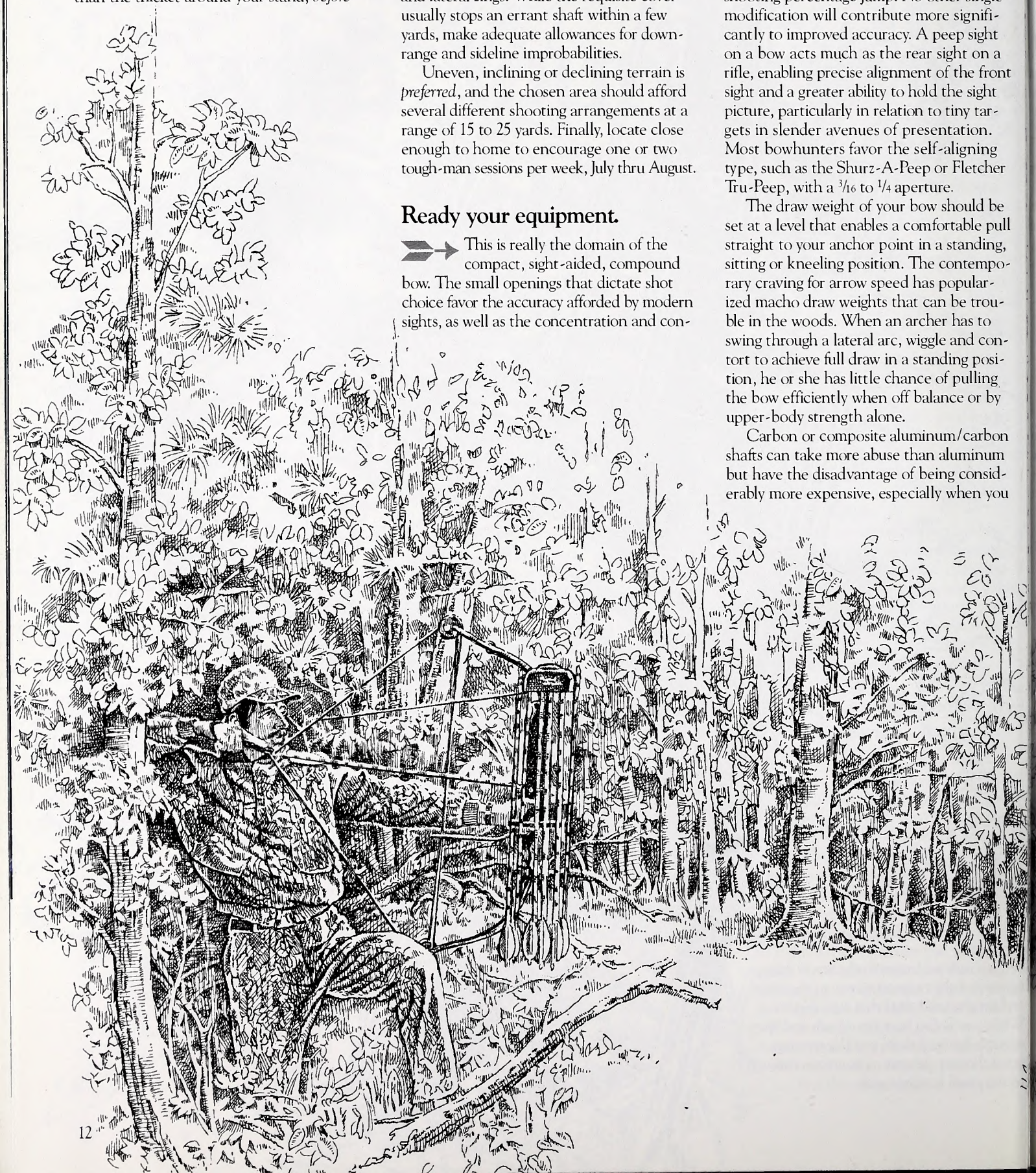
Ready your equipment.

This is really the domain of the compact, sight-aided, compound bow. The small openings that dictate shot choice favor the accuracy afforded by modern sights, as well as the concentration and control enabled by the cam-assisted holding weight of the compound configuration.

Sight alignment and draw weight are the primary concerns. If you do not currently shoot with the aid of a peep sight, have one installed on your bowstring and watch your shooting percentage jump. No other single modification will contribute more significantly to improved accuracy. A peep sight on a bow acts much as the rear sight on a rifle, enabling precise alignment of the front sight and a greater ability to hold the sight picture, particularly in relation to tiny targets in slender avenues of presentation. Most bowhunters favor the self-aligning type, such as the Shurz-A-Peep or Fletcher Tru-Peep, with a 3/16 to 1/4 aperture.

The draw weight of your bow should be set at a level that enables a comfortable pull straight to your anchor point in a standing, sitting or kneeling position. The contemporary craving for arrow speed has popularized macho draw weights that can be trouble in the woods. When an archer has to swing through a lateral arc, wiggle and contort to achieve full draw in a standing position, he or she has little chance of pulling the bow efficiently when off balance or by upper-body strength alone.

Carbon or composite aluminum/carbon shafts can take more abuse than aluminum but have the disadvantage of being considerably more expensive, especially when you



can expect to profoundly disable several.

You'll need at least one fully dimensional, deer-sized game animal target with a vital-area scoring ring. If you don't have one around and need to buy, mail-order houses like Cabela's and Gander Mountain catalog both McKenzie and Delta targets in a variety of species at better-than-average retail prices. The newer McKenzie HD (high-durability, high-detail) animals cost a bit more initially but will last many seasons, make arrow pulling easier and have great motivational realism.

Recruit a buddy or two.

You can pool targets, challenge each other, celebrate hits, laugh at misses, share technique and make shooting sessions more fun and profitable.

Target placement, ground rules, and shooting.

Level One. Place targets broadside at no more than 15 to 20 yards in cover that obscures 50 percent or less of the animal and offers moderately challenging shot choices through and between leafy branches, limbs, tree trunks and brush. Each hunter is allowed one arrow. If a arrow is lost or banged up to the extent that it can no longer be safely shot, the shooter is barred from further competition in the series. Shooters are allowed to move at will around each target for a shot choice, as long as the designated range is observed, and as long as at least half the shots taken are from a sitting or kneeling position.

One shot per shooter at each available target on the course constitutes a round, and each archer shoots a series consisting of three rounds. Each series is shot for cumulative score; high man claims bragging rights. Shoot several series for total score in each practice session without allowing yourself to become overly tired.

Level Two. After two or three sessions, up the ante. If you were able to attend an actual tough-man competition, this is where that experience will be helpful. Target range should be increased to 20 or 25 yards, with at least 75 percent of the target mass hidden by screening cover. Take advantage of terrain diversity, such as incoming or declining slopes, ditches, gullies, or swales, to frustrate depth perception. Use available front lighting and backlighting to dapple or darken the target. At Level Two, hunters are no longer allowed to move around the target freely. Work together to establish a shooting station at each target site, and introduce slight target angles, so that vital zones are no longer directly broadside. Locate shooting stations creatively so that the only viable line of sight forces an aggravated shooting form, with modest stretches and leans.

Once the course is established, the shooting and scoring rules remain the same as at Level One. Shoot until the course begins to stale, then rearrange targets and shooting stations for a fresh layout.

Level Three, Graduate Course. Only a few good men will persevere to a bragging score at this level. If you've hung in for Levels One and Two, you'll be one of them.

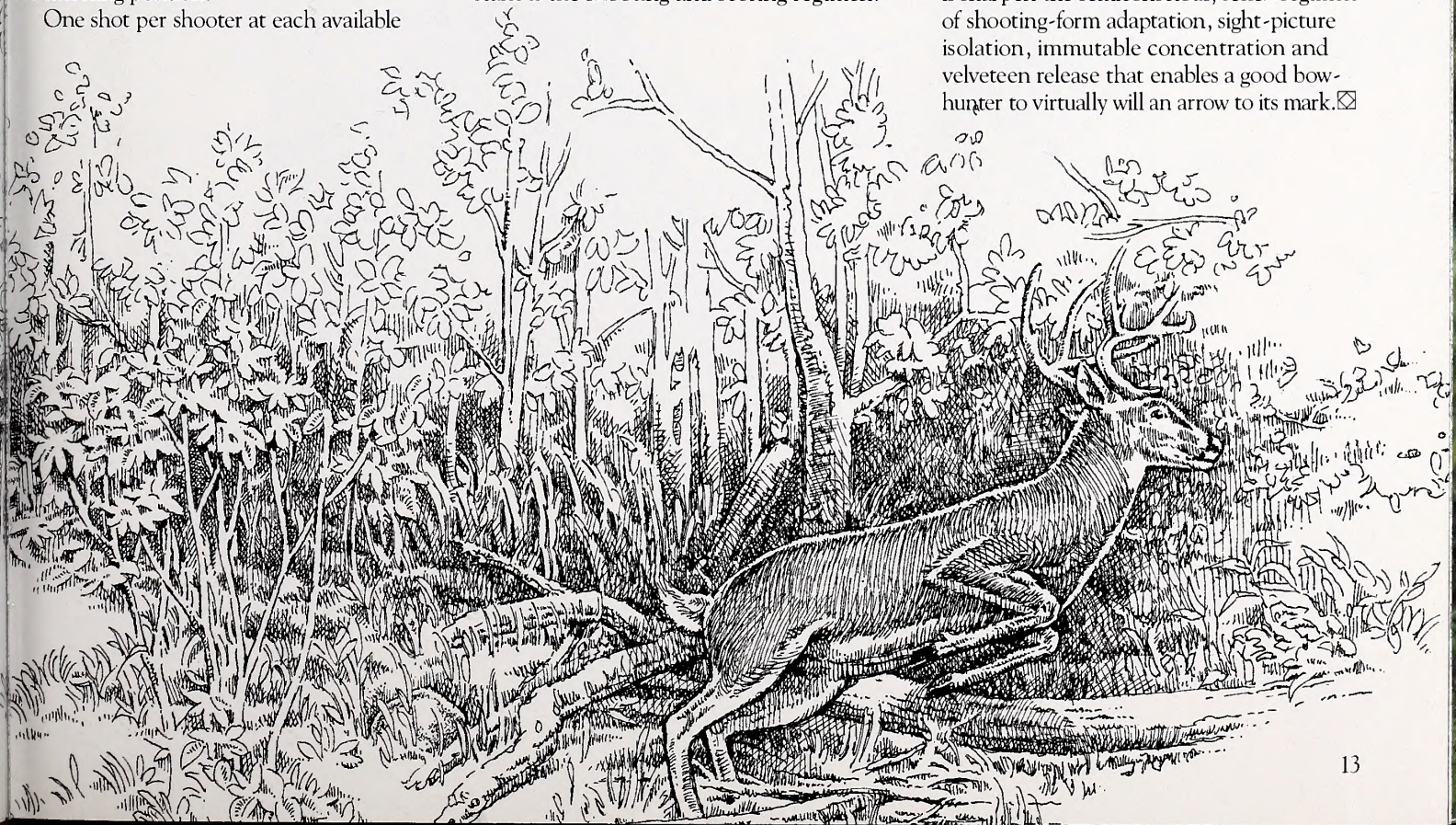
Level Three is a free-for-all. The only constant is the shooting and scoring regimen: single arrow, three rounds for a series, cumulative scores determine series honors.

In these sessions, each hunter designs and sets up a separate target layout to maximally challenge his competitors in each series, retaining both the privilege and the "reality check" obligation of shooting his or her own target as a part of each round. The target can be as much as 90 percent obliterated by intervening cover, which may include a light screen of twigs and leaves between the shooter and the vital zone. Shooting stations may require extended stretches and leans. Terrain diversity and lighting aberrations may be used to extreme. Vital-zone angles may be dramatically altered as long as they do not exceed the limits of a feasible bowhunting opportunity. A time limit may be imposed to heighten shooting tension.

Target layouts are freshened with each new practice session.

Allocate roughly 25 percent of your available practice sessions to Level One exercises, 50 percent to Level Two, and the balance to Level Three. The ground rules are guidelines, the concept quite elastic, so modify them as desired for your benefit and enjoyment. When you can send the majority of your arrows home to the scoring ring, you're getting the job done.

Extreme-cover practice hones archery skills like leather strops a razor. Its purpose is not solely to engender exceptional shooting in tight quarters, and certainly not to encourage shooting when ethical respect for a game animal dictates otherwise. What it does better than any other simulation system is sharpen the semiconscious, reflex regimen of shooting-form adaptation, sight-picture isolation, immutable concentration and velveteen release that enables a good bowhunter to virtually will an arrow to its mark.



The Crabber's Cadence

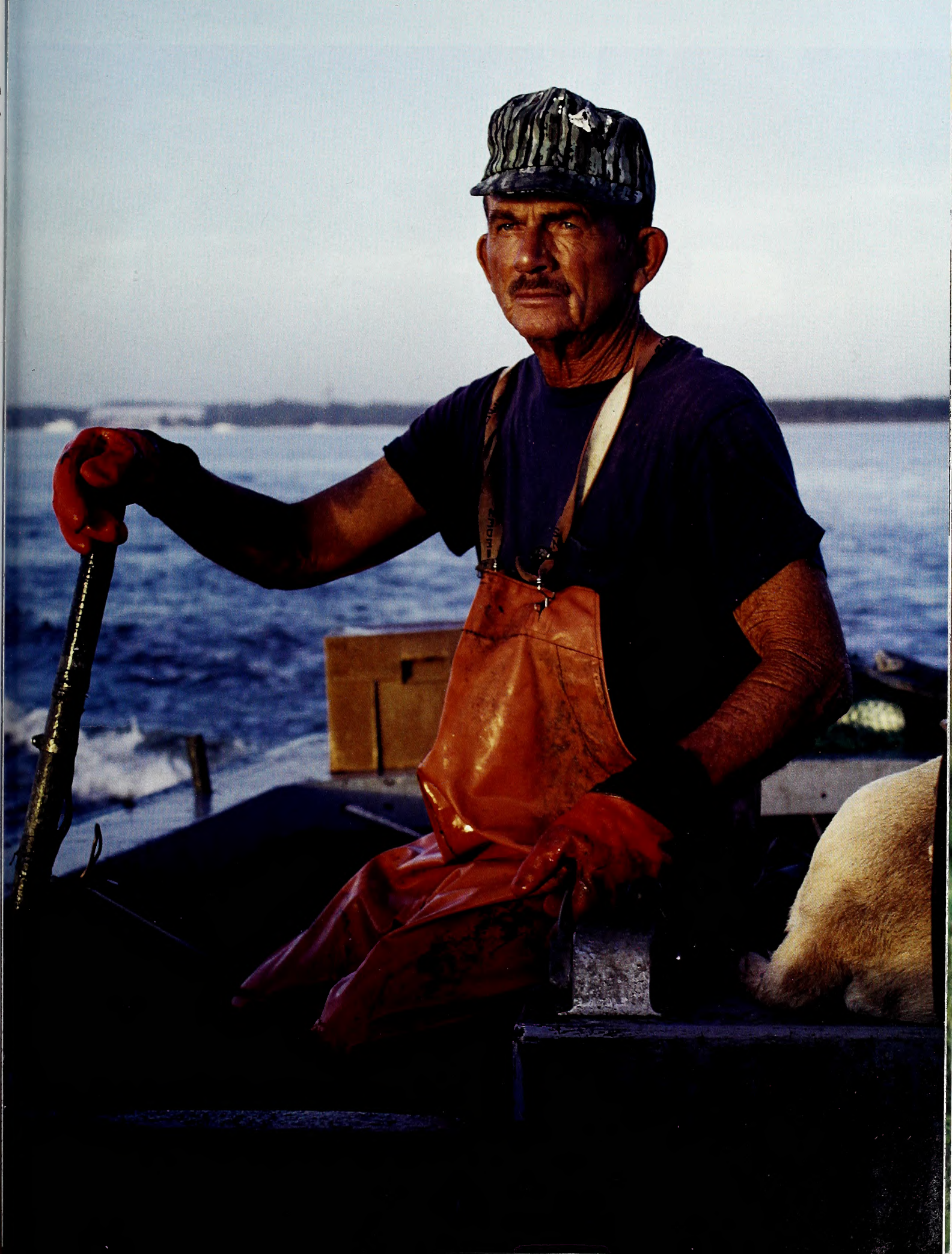
written by Eddie Nickens ©1997 / photographed by Melissa McGaw

The day begins at dark-thirty before the sun pushes over the dark humps of the nearby Outer Banks. At first light Edward Etheridge is on the boat, a 25-foot deadrise skiff, motoring to the bait dock for 120 pounds of menhaden. His yellow Lab Sandy watches from her perch amidships. She is 12 years old, Etheridge says, and "She ain't missed many days, I'll tell you."

Neither has the 71-year-old Manteo native. For nearly four decades Etheridge has crabbed the waters of Roanoke and Croatan and Pamlico sounds. For nearly four decades his days have begun in the dark.

It is 20 minutes to the first pot. Etheridge pulls it in hand-over-hand, shakes the crabs into a plastic box and stuffs a handful of bait into the cylindrical wire pocket of the crab pot. Some fishermen work 800, 900, a thousand pots at a time. "About 150 pots, that's all I fish," Etheridge says.

His is a simple reasoning. "I fish alone, by myself," he says. "Started out that way. When I get ready to go, I go. If I want to come in early, I come in early. If I want to stay late, I stay late. I like the independence of it. I like to be my own boss."



The season begins at half-past winter, by the last of February or the first week of March. As the waters warm, the crabs move from their winter burrows in the mud towards water with the higher salinities required to spawn. "I start working towards the inlets," Etheridge says. "Just a little later you can catch them most anywhere, but in the early spring the female crabs are lookin' to spawn, and that's where they'll be."

Not so long ago the crabbers fished with trotlines, not crab pots. "Everybody used trotlines," Etheridge says, and he describes them—a mile or so of cotton line with a baited slip knot every 3 feet. Etheridge baited with "bull lip," the salted skin from the face of a cow, but most any meat would work. It wasn't until 1938 that the modern crab pot was invented by a crabber in Chesapeake Bay. Catches soared. These days, Etheridge says, "Well, maybe 800 to 1,000 pounds is a good day for me, a big day for me."

But big day or slow, April or November, the rising sun finds the crabber on the water. "Every day I can go," he says, "I go."

The softshells come on the spring's full moon. There are a few here and there before and after, but when the moon is fat in late May or early June, it heralds the "big run."

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

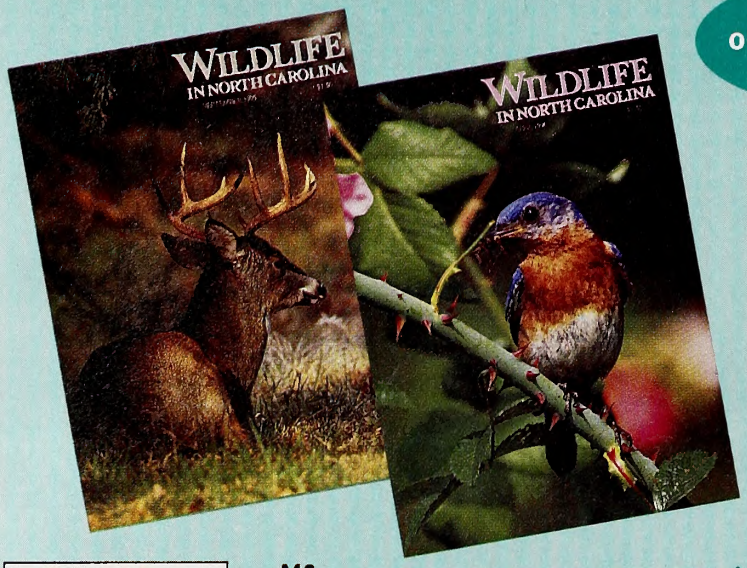
- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

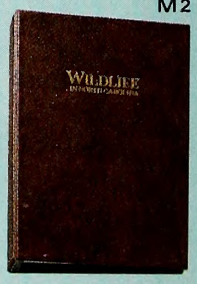
Wildlife in North Carolina Magazine

See our easy-order subscription form on back!

- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**



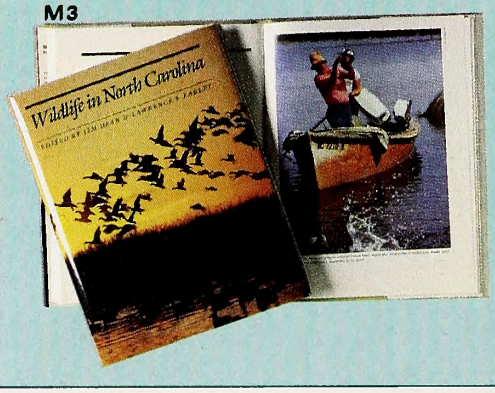
M2



- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**

M8

M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

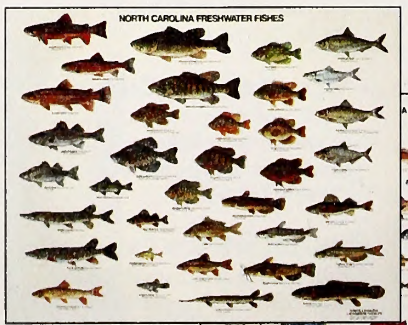
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

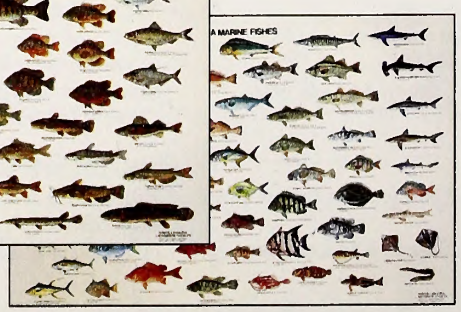
- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**



P6



P7

P3 P4 P5 P8

- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

MAGAZINE SUBSCRIPTIONS

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

MAGAZINE GIFT SUBSCRIPTIONS

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

_____ Magazine/gift subscriptions **TOTAL**

EDUCATIONAL MATERIALS

WS97

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip ___ ___ ___ ___ - ___ ___ ___ ___

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL**	$
Discount (subtract 15% discount for **retail** orders of $100 or more)	$
Sales tax *(N.C. residents add 6% sales tax)*	$
Educational materials **TOTAL**	$

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths. Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence
☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires____/ _____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ ____ ____ ____ ____ ____

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

The Hard and the Soft of Crab Cookery

These days, softshell crabs are available at any good seafood market, but the best place to buy them is at a waterside crab shack or fish house. Live softshell crabs will last maybe a week in the refrigerator; cleaned crabs for two or three days. If you're a first-timer, you may want to buy cleaned crabs, or at least ask the seafood dealer to show you how to make a softshell crab pan-ready. It's simple enough: With a knife blade, slice behind the eyes and mouthparts to remove the "face," then flip the crab over and remove the triangular "apron," along with the internal organs it protects, and the gray, feathery gills. Once your crab is cleaned and ready for the stovetop, a simple preparation is often the best.

Plain Ol' Fried Softshell Crab

There's nothing simpler. Dip a cleaned softshell crab in milk, then lightly dust with flour seasoned with Old Bay Seasoning and sauté in hot butter or oil until the legs are crunchy and the body nice and brown. "I like 'em kinda crispy-like," says Etheridge. Sage advice. Squeeze a lemon wedge over the crab and serve by itself with cocktail or tartar sauce, or in a sandwich with mayonnaise and avocado.

For a twist, marinate the crabs in buttermilk sprinkled with dill and white pepper, then dredge in flour and fry. One of the great sins of softshell crab preparation is ladling sauce over the prepared crabs, which renders them soggy. Instead, prepare this zesty tartar sauce and let diners season crabs to taste.

Jalapeno Tartar Sauce

From Nathalie Dupree's *Southern Memories* (Clarkson Potter, 1992)

½ cup mayonnaise
¼ cup red onion, finely diced
2 tablespoons capers, finely chopped
1 to 2 jalapeno peppers, finely diced
1 teaspoon Dijon mustard
Tabasco sauce, to taste

Combine ingredients in a medium bowl. Stir well and refrigerate for several hours to let tastes mingle.

Mojo Softshell Crabs

(From the Beaufort Grocery, Beaufort, N.C.)

8 jumbo softshell crabs
6 egg whites
½ cup grated Parmesan cheese
1 tablespoon parsley, chopped
Salt and pepper to taste
1 cup all-purpose flour, for dusting crabs
6 cups oil for deep frying
Mojo sauce (see recipe below)

Clean crabs and pat dry. For batter, whip egg whites until just before the soft-peak stage. Fold in cheese, parsley, salt and pepper. Dust crabs in flour, then immerse in batter. Deep-fry crabs in 350-degree hot oil until golden brown, about 4 minutes. Drain on paper towels. To enhance crispness, place crabs in 350-degree oven for 1 to 2 minutes before serving. Serve crabs on top of Mojo sauce.

Mojo Sauce

1 tablespoon fresh shallots, chopped
2 cups cream
1 tablespoon capers
Juice and zest of 1 lemon
Salt and pepper to taste

Combine all ingredients in a saucepan and reduce by half over high flame until sauce is thick enough to coat the back of a spoon.

Crab Cakes

Crab cakes are too tasty and too easy to make to confine to restaurant outings. Here's a basic recipe, but don't stop at this. Create a personal signature to your crabcakes by adding capers, bits of country ham, diced sun-dried tomatoes or chopped gourmet mushrooms to the mix.

1 pound fresh lump crabmeat
Juice of ½ lemon
4 ounces milk
4 ounces light cream
4 ounces fresh breadcrumbs
fine dry breadcrumbs
½ teaspoon cayenne pepper
½ teaspoon dry mustard
2 teaspoons Worcestershire sauce
¼ teaspoon Tabasco sauce
butter and oil, mixed for frying

Combine and mix thoroughly all ingredients except for the fine breadcrumbs and butter-oil mixture. Form into eight patties. Roll in fine dry breadcrumbs and sauté in butter and oil until golden brown.

On this night the crabs molt en masse, "busting" out of their shells. For about 24 hours the carapace is soft, and crabs caught during that time can be eaten whole. Softshell crabs are considered a delicacy, and they command prices many times the price of a hard crab.

Crabs within a few days of molting are called "peelers," and the experienced eye can tell how close the crabs are by the darkening color of the carapace or a line of color on the back edge of a rear fin. A red line means the crab is within a day of turning soft; a pink line means the crab won't bust for another few days. "A white-line peeler," Etheridge says, "now, sometimes it'll take him a couple of weeks to get soft."

"What we're after is the small female peelers," Etheridge says, "so we put a big male crab in a bait pocket to attract the female crabs that get the scent of the male. Sometimes you'll get 35 or 40 or 50 peelers in one peeler pot. And you might catch a lot of them in one place today, and tomorrow they'll be gone."

Some crabbers keep their peelers in onshore tanks to wait for the molt and the crab's value to soar. Not Etheridge.

Instead he calls for Sandy in the dark, and they settle into their time-honored seats in the skiff. The rising sun lights a path of gold towards the barrier islands. Crab pot floats bob as far as the eye can see. Etheridge pulls one over the scarred gunwale and shakes the crabs, glinting blue like lapis, into the crab box.

"That's the way it goes," he says, "row after row 'til I get 'em all fished."⊠

PINPOINT TDP 3700
PINPOINT
TOTAL DEPTH PERCEPTION

Bass Pros Talk SPINNERBAITS

If you follow these tips, you'll learn why the spinnerbait is a favorite lure among the nation's top bass tournament professionals.

written and photographed by Soc Clay ©1997

It has generally been accepted that there are about a half dozen basic lures that will take care of most bass fishing situations. Essentially, that's proven by America's top professional bass fishermen each time they compete in a tournament. An average of five lures is used during the course of a day's competition.

Top bass anglers believe you may be able to further narrow the list to only three lures: the plastic worm, jig and spinnerbait.

The worm and jig choices were automatic, but the inclusion of the spinnerbait by nearly every professional bass angler comes as somewhat of a surprise. True enough, spinnerbaits will likely be found in nearly every bass angler's tackle box, but many anglers don't always use this lure to full advantage. Those who do use it effectively believe it's the most versatile, weedless muddy-water lure of them all for bass.

Roland Martin, who is considered one of the true pioneers of modern bass fishing, is convinced that the spinnerbait is the finest lure ever developed for muddy-water conditions that occur when water temperatures are above 60 degrees F. He also has other uses for it as well.

Martin recently revealed one of his long-time secrets for catching very big bass from weed-infested lakes. He uses a very large, single-blade willow leaf spinnerbait in heavy weeds, where the extra flash of the large blade can attract active bass from greater

F. EUGENE HESTER

***In early spring's** cold and often muddy water, the spinnerbait is a versatile and reliable lure that will fool big largemouths like this one (opposite page). Equipped with several types of blades (top of page), these lures have both flash and built-in vibration. A squiggly skirt and soft plastic or pork trailer make these lures even more appealing.*

MELISSA McGAW

Two fishermen *probe a grassy shoreline, a typical spot for a spinnerbait. These lures are very nearly snag free, making them great favorites for fishing shallow cover or weed beds, although they can also be fished slowly and effectively on deeper structure.*

distances. The streamlined design of the willow leaf is also easier to work through dense weedy areas than the more conventional Colorado-type blades.

Basically, Martin uses the spinnerbait in three distinctive fishing situations. During the pre-spawn period, when bass are found on shallow stump- and weed-infested flats, he uses a technique he calls "bump the stump" to crash a spinnerbait with dual willow leaf blades into stumps, logs or other kinds of cover that can be found in shallow water. He finds it especially effective when the target is surrounded with lilies or other types of vegetation. If the water is also muddy, that's all the better.

His basic technique for fishing the spinnerbait under these conditions is to work shallow shore cover, using the bump-the-stump technique to make sure the spinnerbait is retrieved close to wood or other solid cover, where the water is sometimes a bit clearer. Under these conditions, a bass will often stick its nose right up against the cover, sometimes as close as an inch away, and the lure has to work in this narrow margin.

Martin also likes to use a spinnerbait at night. "In spring, I like to get out during the day to locate spawning beds," he explained. "I don't bother the bass then, but that night I will go back to the same area and throw a spinnerbait across the beds and often have some fast action." Since he releases all his fish, there's little impact on the population.

Martin uses the heaviest line that's practical for such fishing, opting for 20- to 25-pound test, especially when fishing heavy cover. A flipping rod is his choice for making long casts across weed-covered flats and areas sparsely dotted with willows and various types of cover. In places where greater casting accuracy is required, he switches to a 5½-foot casting rod.

Hank Parker, a longtime successful bass

fisherman and TV fishing personality, also likes spinnerbaits, naming them one of his three favorite lures. A tandem, gold-bladed model is his first choice.

Parker uses a spinnerbait to cover water quickly, eliminating spots that don't contain fish. A muddy-water specialist, Parker likes Indiana blades in sizes 3 and 4 and will work the spinnerbait as close to stumps and logs as possible in murky water. He believes in pinpoint accuracy, especially when working tight shore brush and low, overhanging branches.

A technique he calls "chiming the blades" has paid good dividends for Parker. He tunes the lure by bending the blade wire so that the blades will bang against each other during the retrieve. Bulging the surface with a large Colorado blade is another effective way he fishes the spinnerbait in spring and autumn when bass are feeding in shallow water. As he retrieves the lure just beneath the surface, the spinner creates a ripple on top.

One of Parker's favorite times and places to use a spinnerbait is during spring when floodwaters are covering trees and low shrubs along shore. Timing is just about perfect when those shrubs are beginning to sprout green leaves. Fishing what he terms a "green-leaf pattern," Parker runs a dual-bladed spinnerbait through any openings among the trees, shrubs and limbs that he can find.

Unlike Roland Martin's "bump-the-stump" technique, Paul Elias of Laurel, Mississippi, believes a spinnerbait is more effective if it doesn't touch the intended cover but just barely misses it. Elias, who became well known in professional bass fishing ranks a few years ago by developing the "kneel-and-reel" technique to win the Bassmasters Classic, is convinced that lure presentation is critically important in heavily fished waters. His favorite spinnerbait is a tandem-blade model that features a No. 4 Colorado blade in nickel finish in front, followed by a No. 5 Colorado blade in gold finish. A Dancing Eel is his favorite hook dressing or trailer (soft plastic or pork trailers are most commonly used).

Elias, like most of the anglers in the pro bass fishing business, follows the concept of matching the color of the hook dressing or trailer to the color of the skirt on the spinnerbait—white on white, chartreuse on chartreuse and so forth.

Elias likes a spinnerbait in spring because it often produces larger fish, but he also fishes these lures in autumn. In fall they tend to catch smaller bass, but more of them. He uses a very slow, crawling retrieve along the bottom of shallow areas to catch lunker bass in spring, but in the fall he retrieves the lure much faster.

Every bass pro has little tricks to make spinnerbaits more effective. Rick Clunn of Montgomery, Texas, believes one such trick involves the kind of rod you choose. Clunn has never converted completely to graphite. In fact, during a major fishing tournament held a few years back, Clunn caused rod designers to sit up and take notice when he attributed a record catch at least partially to the fact that he used a fiberglass-tipped rod. According to Clunn, the slow reaction of the softer fiberglass rod allows bass more time to take a spinnerbait before the angler can set the hook, thus fewer strikes are missed.

Clunn's favorite spinnerbait is a long-armed model featuring a tapered wire arm. This design sets up a special vibration that, in his opinion, creates a better action for a spinnerbait. Clunn picks the long-arm models because they are even more weedless in the very heavy cover he likes to fish.

Although every angler has different preferences, most expert bass fishermen agree that some sort of spinnerbait is one of the best of all bass lures. If it's not already one of your favorites, maybe you need to give it another look. ⊠

***Spinnerbaits can** effectively probe woody structure like this fallen tree without hanging up during any season, but they're at their best in colder water in spring or late fall, especially if the water is a bit murky.*

Eel Excursions

No matter how far inland you find them, eels have one thing in common. They all came, somehow, from the Sargasso Sea.

written by David Lee ©1997
illustrated by Chris Armstrong ©1997

They' re hiding under rocks, far up the Mississippi basin, beyond Baton Rouge, Vicksburg, Memphis and Louisville, and well past Cincinnati and Huntington. In fact, they're slipping under rocks in the New River drainage of western Virginia upstream almost to the North Carolina border. Though it is not surprising that the common freshwater eel, *Anguilla rostra*, is in the New River (they are found in nearly every body of water draining into the Atlantic and Gulf slopes of North America), its presence this far upstream is outright astonishing.

Laying out a piece of string on an Exxon road map, I tried to follow the snaking route these eels followed to get them all the way from the Gulf of Mexico to the New River. Making tight turns secured with tape, the string twisted back toward the spawning grounds in which the eels were conceived. Measuring the string against the scale of the map, I obtained a crude distance approximation of the eel's migration, roughly a thousand miles from the Gulf of Mexico. Other eels have taken even longer routes to Kansas, Nebraska, South Dakota, Minnesota and even central New Mexico.

Eels come from and then return to the sea, but their comings and goings have perplexed humans for centuries. Aristotle was one of the earliest writers to present observations on European eels, and he was also the first to recognize that the young eels, called "elvers," came from the sea and that, as adults, they returned to it. Nevertheless, in the centuries that followed much fantasy was written about eels, and some of the most preposterous fish stories ever were proposed.

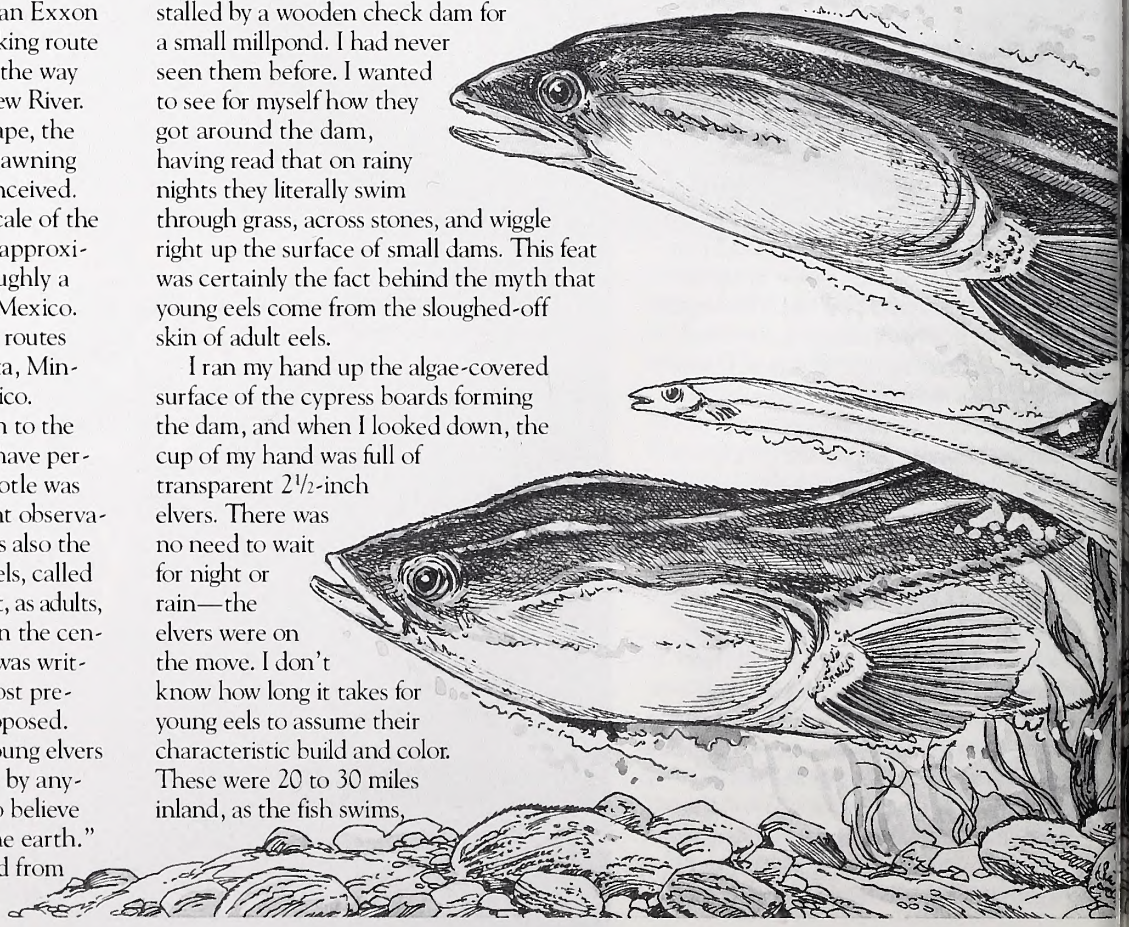
The explosive appearance of young elvers in spring—strange looking beasts by anyone's standards—caused people to believe they came from the "entrails of the earth." Others suggested that eels emerged from the skin of large "worms" or that shreds of skin left by adults rubbing themselves on rocks somehow turned into little eels. Other stories tell of supposed aphrodisiac powers possessed by eels and the tall tales of romantic encounters between male eels and female catfish border on the pornographic.

Even the fish stories of modern-day bass fishermen pale in comparison.

One April I watched faint shadows dancing on a sandy creek bottom. Puzzled, I dragged a net through the water and, to my surprise, caught dozens of glass eels, the elvers of *Anguilla*. They had been temporarily stalled by a wooden check dam for a small millpond. I had never seen them before. I wanted to see for myself how they got around the dam, having read that on rainy nights they literally swim through grass, across stones, and wiggle right up the surface of small dams. This feat was certainly the fact behind the myth that young eels come from the sloughed-off skin of adult eels.

I ran my hand up the algae-covered surface of the cypress boards forming the dam, and when I looked down, the cup of my hand was full of transparent 2½-inch elvers. There was no need to wait for night or rain—the elvers were on the move. I don't know how long it takes for young eels to assume their characteristic build and color. These were 20 to 30 miles inland, as the fish swims, and, except for their eyes, they were still transparent. Hemoglobin, which would eliminate their transparent cloaking device, does not form until the eels are older.

Once past this stage in their tortuous life history, eels are known to eat a variety of freshwater fishes and invertebrates. While food habits vary from place to place and with season, generally 90 percent of their diet consists of larval aquatic insects such as mayfly, stone fly and dragonfly nymphs. The freshwater behavior of the eels further complements the mystique surrounding them. They swim freely in the muddy, silty bottoms of

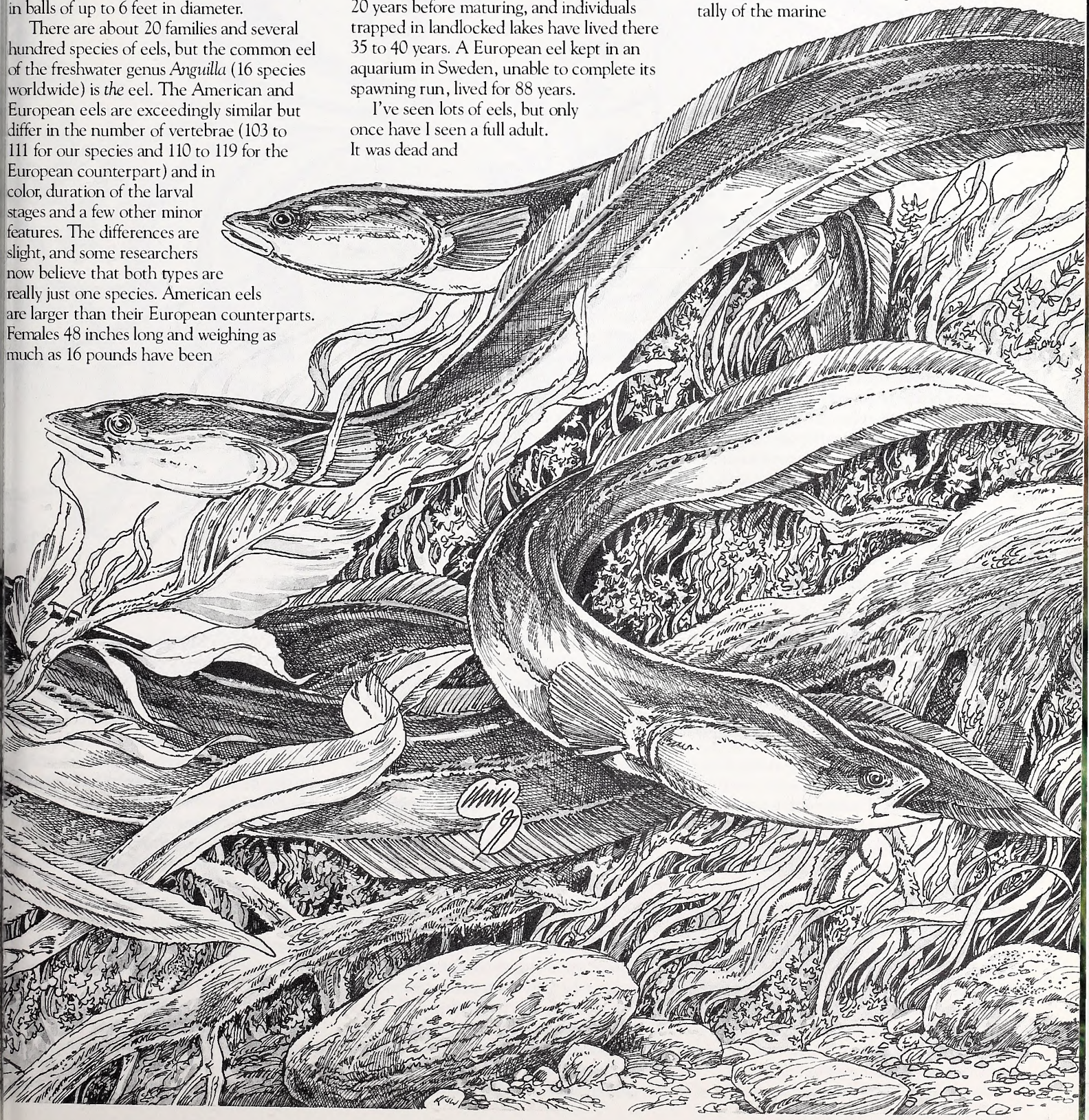


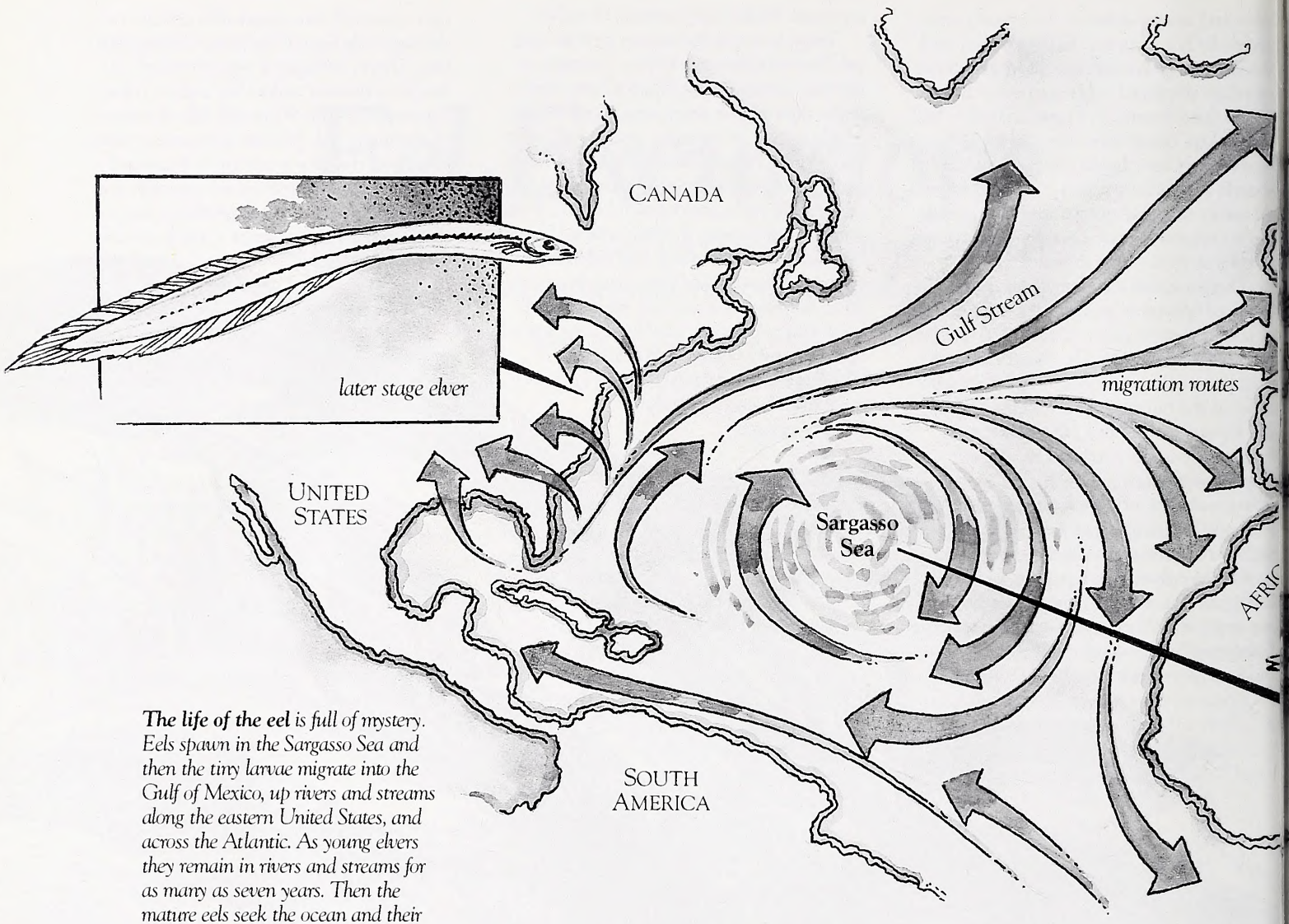
lakes and among stones in rivers and creeks, generally lying buried during the day and throughout the coldest parts of winter. Experimentally displaced eels returned to home creeks from distances of up to 50 miles. Individuals kept out of water survived for 48 hours. Researchers have heard chirping, notelike sounds and sucking noises coming from eels on warm August evenings, and mature eels during migration have been found entwined in balls of up to 6 feet in diameter.

There are about 20 families and several hundred species of eels, but the common eel of the freshwater genus *Anguilla* (16 species worldwide) is *the* eel. The American and European eels are exceedingly similar but differ in the number of vertebrae (103 to 111 for our species and 110 to 119 for the European counterpart) and in color, duration of the larval stages and a few other minor features. The differences are slight, and some researchers now believe that both types are really just one species. American eels are larger than their European counterparts. Females 48 inches long and weighing as much as 16 pounds have been reported. Males rarely exceed 24 inches.

There is no precise answer to how long eels live in fresh water before returning to the sea. Generally the females leave fresh water after about seven years, and males, which mature in estuaries, return in four to seven years. Nevertheless, the growth rates and ages of freshwater eels, like most aspects of their life cycle, are not well known. Some females will remain in fresh water 15 to 20 years before maturing, and individuals trapped in landlocked lakes have lived there 35 to 40 years. A European eel kept in an aquarium in Sweden, unable to complete its spawning run, lived for 88 years.

I've seen lots of eels, but only once have I seen a full adult. It was dead and rigor-mortised into a snakelike posture near the high-tide line of the lower Chesapeake Bay. Three, perhaps 4, feet in length, it was not brown or yellow but a silver color, approaching that of the dull side of a piece of aluminum foil. Its large eyes were sunken, indicating that it was not fresh. I resisted taking it home. There was no question that it was *Anguilla*, but the appearance was so striking that I had to make a quick mental tally of the marine





The life of the eel *is full of mystery. Eels spawn in the Sargasso Sea and then the tiny larvae migrate into the Gulf of Mexico, up rivers and streams along the eastern United States, and across the Atlantic. As young elvers they remain in rivers and streams for as many as seven years. Then the mature eels seek the ocean and their spawning grounds in the Sargasso.*

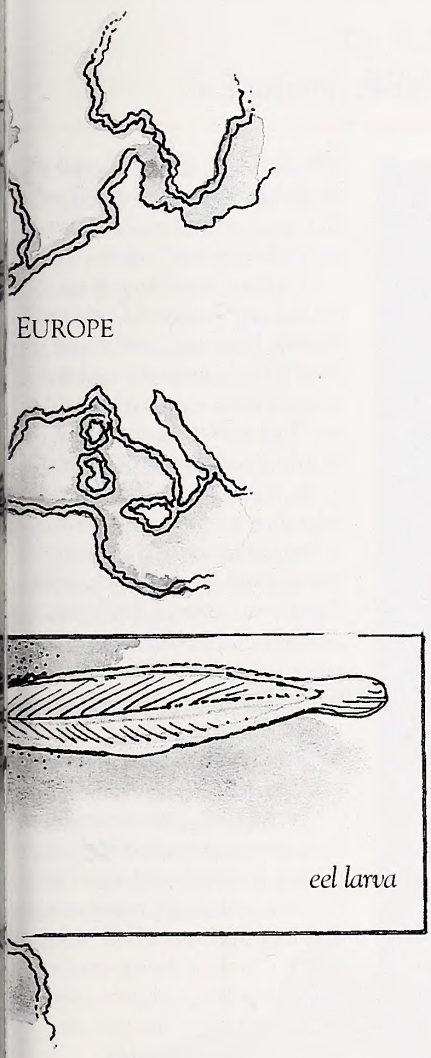
eels of the area to convince myself that my identification was correct.

In preparation for its marine journey this eel had made one final transformation, not as spectacular as a caterpillar becoming a moth, or even an eel larva becoming a full red-blooded fish, but a striking change nevertheless. In this process the eel's scales become firmly fixed and its skin toughens and grows thinner, forming a silver, metallic sheen. The lateral line, a sensory system, increases, and nostrils dilate. The eyes are most striking. They double in size, giving a totally different set of proportions to the head. Biologists studying changes in the eye have shown that the area of the retina quadruples, with the total volume of the eye increasing eight times. A change in the retina color allows for absorption of blue light, the only wavelength that penetrates the sea. The digestive tract shrinks, and by late summer the homeward-bound eel ceases to feed. Its body is programmed for two goals—movement toward the spawning grounds and spawning.

Even for the best-studied eel species, once an eel leaves fresh water, its movements are unknown. No one really knows where eels go or how they go about getting there. Only a handful have been captured at sea, only one has been photographed in the ocean, and the eggs have never been found in all the thousands of North Atlantic plankton studies. To some extent *Anguilla* is still the mystery it was in 350 B.C. However, the silver color of the eels, the increase in their eye size, and a change in the size of their swim bladder all suggest that eels probably migrate through the sea at a depth of about 500 feet.

Known swimming speeds of tagged migrating eels are 30 to 40 miles per day. Knowing this, we can project a travel time of 80 days to the Sargasso Sea for European eels and less than that for ones leaving the American coast. Eighty days is a relatively short period for fasting migratory fish. Atlantic salmon, for example, may fast for 10 months before completing spawning runs. Based on the size of the smallest larvae, and an assumed egg development of only several days, biologists believe that the adult eels spawn in late winter and early spring, leaving their progeny to ride the currents. Actual counts of developing eggs in mature eels exceed 2.5 million. The whole process seems terribly inefficient, but like primitive plants with wind-transported spores, eels persist.

The exact spawning area of these adult eels has never been discovered, but it is assumed that adults of both the American and European eels breed in the Sargasso Sea, located in the North Atlantic, and then die. The fact that an exact breeding site, if one exists, has not been established is not in itself surprising. The Sargasso Sea is nearly the size of the United States and is rarely visited. Furthermore, a complex gyre of currents, one of which is the Gulf Stream, and countercurrents would disperse eggs and larvae quickly.



eel larva

In a study that lasted from 1904 to 1922 a Dutch biologist collected eel larva from throughout the North Atlantic and Mediterranean. He mapped the catches by size and season and found that the smallest eels represented two distinct populations that drift as plankton in the currents of the North Atlantic. The larvae of the European eel complete a circuit around the gyre of the Sargasso Sea in approximately two-and-one-half years. The American eel's larvae have a similar journey, but it lasts only one year.

Despite 15 years of fieldwork in the Gulf Stream, a current that must transport untold billions of larval eels, I have never seen one. Nevertheless, here they must drift and perish in astronomical numbers. They are as common as raindrops, and many are as short-lived. Biologists collecting the larvae have found them to drift at depths of about 1,000 feet, moving upward, like so much of the Gulf Stream's euphotic fauna, to 500 feet at night. I have looked unsuccessfully for their small, transparent leaf-shaped bodies in the stomachs of seabirds collected off North Carolina. We have found that a number of mid-water-column organisms are forced to the surface by strong upwellings along the Gulf Stream's western front. These patchy food sources provide livelihoods for entire communities of birds, and the eel larvae must be part of them.

Unless they swim under it, the strong northbound current of the Gulf Stream presents a formidable obstacle for planktonic fish larvae genetically programmed to move toward shore. Larvae would be swept northward at rates of at least 100 miles a day, and perhaps half that again. How many days would it take one to swim across a current that is 70 miles wide at Cape Hatteras? How do any of them make it? Probably the small percentage of larvae that survive to change into elvers do so after they reach the rather quiet waters over the continental shelf. Perhaps the ones that complete their journey are carried toward shore by the giant warm-water eddies that periodically break free of the stream and drift lazily northward over the continental shelf. Some eddies persist for months and would provide efficient, if not safe, transport for planktonic transforming larvae.

In their transformation from larvae, elvers actually decrease in size. Yet, compared to the larvae, they can swim better and now have direction in their life. Still, it's hard to imagine how they cope with tides, longshore currents and the downstream spring rush of rivers. Starting in late winter they begin to arrive in fresh water, but unlike salmon, they are not believed to be programmed to find parental rivers.

A spring visit to almost any small creek near the coast will yield a number of elvers and is a testament to the driving force of migration. The odds of any given eel larva getting this far in life must be phenomenal; the fact that they arrive at all suggests that the spawning output of the adults is beyond comprehension. But many do survive, and in places they come in great numbers. In good years the elver fishery on the Severn River in England may be as great as 50 tons. That's a lot of eels for one river system.

How did such a lowly, primitive fish develop such a strange, seemingly backward and taxing migration? Salmon, marine lampreys and other anadromous species have a life-style that at least makes sense. Adults funnel their reproductive energy into the headwaters of rivers, where the concentrated adults have an increased chance of finding a mate, eggs can be hidden in gravel, and young are protected until they have a chance to grow and have the strength and wit to live in a chaotic, predator-filled ocean. But eels are forced into the currents of the sea and against the downstream flows of rivers when they are a size least able to cope with those hazards.

Many ichthyologists now suspect that eels, both American and European, originally bred in a small sea, perhaps a river, that once separated North America from Africa. At one time the coast of Europe fitted against North America, and Brazil nested into the Gulf of Guinea on the African coast. Two hundred million years ago, during the Triassic age, a crack split the land masses. As the crack widened, water filled the void. Eels moving upstream from spawning areas came from this inland sea, which eventually grew into the Atlantic Ocean. The eels remained loyal to their spawning ground and returned to the same general site, generation after generation. The eel's homing behavior has a built-in loyalty, not much different in concept from that of a pigeon to its roost. The spawning site, we now know, is somewhere past the Gulf Stream in the Sargasso Sea.

At first such a theory seems preposterous. Yet, it has been discovered that eels, like many other migratory animals, have bits of magnetite in their heads. Perhaps this enables them to maintain migration routes that relate to advancing magnetic plates. As I write this, the Atlantic continues to widen. Continents continue to move apart at a rate of about 3/8 inch per year. Four inches in an average eel's lifetime, thousands of miles in the history of the species.

The migration of *Anguilla* is simply an extension of a universal pattern in these eels. All the spawning takes place in warm marine waters at considerable depths. Some species live close to their breeding areas; others travel to grow and mature in inshore areas, some to lagoons and estuaries, and, in the extreme case of *Anguilla*, into fresh water. The fact that some American eels spend their adolescent period in the New River of Virginia and North Carolina, geologically aged at many million years and believed by some to be the second-oldest existing river in the world, makes the story of these ancient fish a little richer. Time, the key factor in the formation of rivers, oceans and eel biology, is the one factor most difficult to comprehend.

No human was around to predict the scenario of this migration as it evolved in a changing world. From before the time of Greek philosophers until the beginning of the present century, all the fable and yarn tellers combined were unable to concoct a tale that could compete with the story the eel itself and time have fashioned. The epic migrations of this fish are unmatched and, even after centuries of curious probing, still not entirely understood. ⊠

Cause Remains Elusive for Most Deaths

Sea Turtle Strandings Shatter Records in 1996

Written and Edited by Rodney Foushee

A third consecutive record-breaking year of sea turtle strandings in 1996 has scientists scratching their heads over why the turtles are having such a tough time off the North Carolina coast.

The North Carolina Sea Turtle Stranding and Salvage Network counted a total of 502 strandings in 1996—a whopping 44.6 percent increase over the previous record of 347 strandings in 1995. There were 297 sea turtle strandings reported in North Carolina in 1994, the record at that point. For the past 15 years, strandings have averaged 196 sea turtles per year, with a low in 1991 of 129 recorded strandings.

"Last year was certainly a record year for strandings, and not just here in North Carolina," said Ruth Boettcher, the Wildlife Commission's sea turtle project coordinator. "South Carolina also reported high stranding numbers."

Despite the huge jump in strandings, scientists still can't explain what killed most of the turtles. "We have turtles washing up in various stages of decomposition," Boettcher said. "Except for those with visible wounds, it is hard to tell even with turtles that come ashore fresh. We simply know so little about these animals, it's hard to determine why they died."

More than half the turtles discovered in 1996 washed ashore in May and June. The majority were stranded on ocean-facing beaches. But departing from past trends, the number of inshore strandings along rivers, marshes and sounds rose from a historical average of 25 percent to 39 percent. Carteret County along the central coast saw the majority of the strandings in 1996. The previous year, the northern counties took the lead.

About 75 percent of the stranded turtles were loggerheads, with the rest consisting of greens, Kemp's ridleys and leatherbacks. While hurricanes Bertha and Fran destroyed most sea turtle nests between Bogue Banks and Cape Fear, a decrease in strandings was reported after the storms.

Some of the carcasses sustained boat propeller wounds while others were crushed, possibly during dredging operations. Some likely drowned in gill nets. But most of the turtles showed no visible signs of injury.

The first mass stranding for the year involved 21 turtles in early May along the Outer Banks. Necropsies showed the animals were seemingly healthy and had eaten recently, but didn't reveal the cause of death.

In contrast, another mass stranding a few weeks later involved sea turtles that were starved and covered with sores. Again, no cause of death was discovered, but disease is suspected. "Without a doubt, a natural disease process is at work," Boettcher said. "The bottom line is we just don't know enough to be exact."

In the past, major strandings have been correlated with intensive shrimping activity. But the required use of metal turtle excluder devices, or TEDs, by North Carolina shrimpers seems to be effective in allowing sea turtles to escape the nets unharmed, Boettcher said.

One bright spot for scientists is they were able to perform more necropsies on fresh sea turtles in 1996 than in past years. The information should help build a database and be useful for future research. And a swell of interest in sea turtles had more than 300 volunteers combing beaches and waterways for stranded turtles last year. That offers one explanation why so many animals were found along inshore waters. "With thousands of miles of coastline to cover, it helps to have more pairs of eyes out there looking," Boettcher said.

The North Carolina Sea Turtle Stranding and Salvage Network is administered by the N.C. Wildlife Resources Commission in cooperation with a team of local, state and federal agencies.

N.C. WILDLIFE RESOURCES COMMISSION

N.C. Aquarium education curator *Andy Wood holds an endangered Kemp's ridley sea turtle at the Fort Fisher aquarium. Volunteers team up with numerous government agencies including the three state aquariums to record strandings and offer some help to sea turtles.*

Tag-A-Giant Conservation Series

Scientists, Anglers Team Up on Bluefin Tuna

Scientists and anglers have combined forces to launch a major study of bluefin tuna off the North Carolina coast.

The Tag-A-Giant, N.C. Giant Bluefin Tuna Conservation Series, has the lofty goal of implanting 100 archival tags in bluefin tunas caught off Cape Hatteras this year. The tags, once implanted inside the fish, will record nearly continuous data on their locations, depths, body temperatures and surrounding water temperatures for up to five years.

The discovery of large numbers of bluefin tunas wintering off the Outer Banks in the past few years has fueled a frenzy of sportfishing activity. Marine scientists have also flocked to the area to study the prized fish. With little known about these highly migratory giants—and their overall numbers in steep decline—the Tag-A-Giant study offers the potential for tremendous scientific gain.

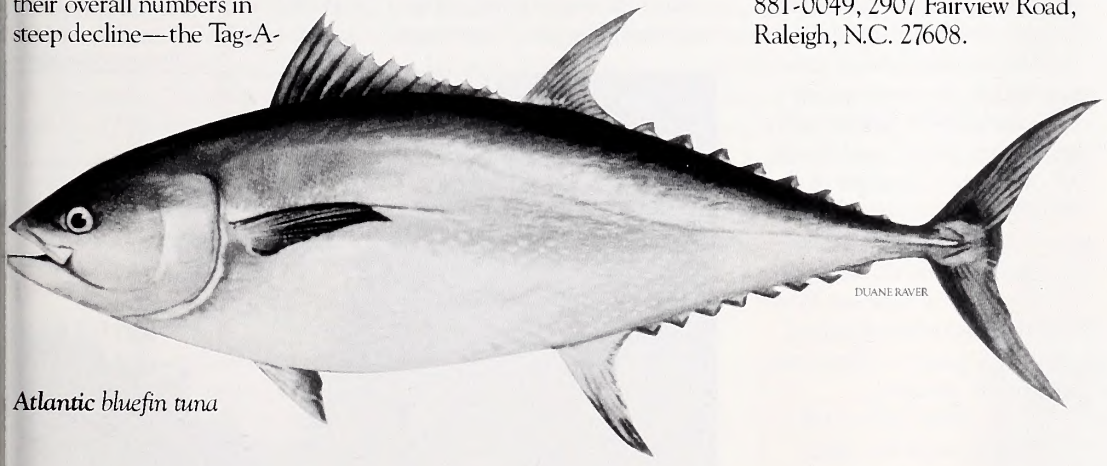
"Nowhere else in the world do researchers have access to the large numbers of medium and giant bluefin available off Hatteras," said Dr. Barbara Block, of Stanford University's Hopkins Marine Station. "Hatteras provides us with the unique opportunity to conduct large-scale studies on Atlantic bluefin tuna."

Scientists from Stanford, the Monterey Bay Aquarium and the National Marine Fisheries Service were set to begin surgically implanting the archival tags in the belly cavities of the fish on Feb. 22. Anglers do their part by paying $1,500 each for the expensive tags and, of course, catching the bluefins. Once a healthy fish is landed, it is transported to a surgery boat out on the fishing grounds where the archival tag is implanted. The tuna is immediately released after the 3-minute surgery. Tagging continues daily through March 15 weather permitting.

Recatching the released fish is critical since that's the only way the data can be retrieved. Scientists expect a recovery rate of 5-10 percent of the tags.

Though the event is not billed as a tournament, a prize will be awarded for the first tag recovered after Feb. 21, 1998. Any proceeds from the event will be donated to the Graveyard of the Atlantic Museum and the Hatteras Village Civic Association. But if there are any winners, it's the fish.

For more information or to participate in Tag-A-Giant, call or write Mac Currin at (919) 881-0049, 2907 Fairview Road, Raleigh, N.C. 27608.



Atlantic *bluefin tuna*

Field Notes

Snow and Blue Geese	Through Mar. 10
Wild Turkey (bearded birds only)	April 12-May 10
Hatchery-Supported Trout Waters	Opens April 5
Wild Trout Waters	Year-Round

Information on bag limits and other regulations may be found in the *1996-97 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission. For more information on waterfowl limits, call 1-800-675-0263.

Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent four months in advance.

Feb. 28-March 2

The 17th annual Dixie Deer Classic will be held in the Jim Graham building at the North Carolina State Fairgrounds in Raleigh. The event is one of the nation's largest deer hunting expositions and draws thousands of hunters each year. For more information, call (919) 782-5333.

March 8

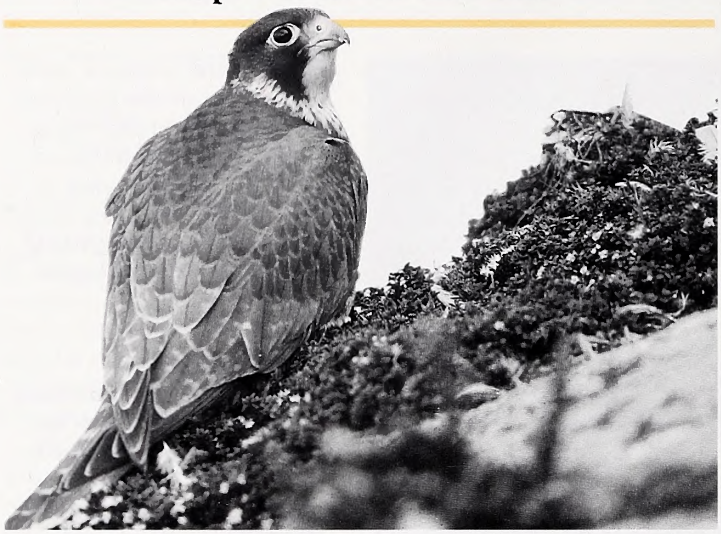
Learn "All About Animals!" at the Schiele Museum of Natural History in Gastonia. This natural history program will help visitors discover firsthand the characteristics of fish, amphibians, reptiles, birds and mammals. For more information, call the museum at (704) 854-6676.

April 4-5

The North Carolina Partners In Flight annual meeting will be held at Blue Jay Point County Park in northern Wake County. The two-day event will feature guest speakers along with demonstrations of bird monitoring techniques, wildlife photography and backyard wildlife habitat creation. For more information, call N.C. Partners In Flight Coordinator Mark Johns at (919) 362-9257.

Nongame Fund Checkoff

Help Wildlife at Tax Time



KEN TAYLOR

***Tax check-off contributions** to the North Carolina Nongame and Endangered Wildlife Fund have been used to restore peregrine falcons like this one in the Tar Heel mountains. These funds are critical for preserving the state's rare and endangered wildlife species.*

The time for filing 1996 income tax returns is just around the corner. When you file this year, consider donating to the North Carolina Nongame and Endangered Wildlife Fund by checking the appropriate blank on your state tax form. These funds are critical for preserving the state's rare, endangered and threatened wildlife species.

Some of the Nongame Program's better-known projects include sea turtle monitoring, peregrine falcon restoration, bald eagle research, flying squirrel studies and colonial waterbird nesting-protection projects. The Nongame Program has been vital in researching rare bats as well as mollusks, crayfish and fish species. The program has also taken the role as lead agency in North Carolina Partners In Flight, part of an international effort to stop the decline of migrating songbird populations.

Though Nongame Fund donations rose slightly last year to $368,129, they have not come close to 1990's record high of $510,269. The overall decline in contributions follows similar trends in many other states with nongame wildlife programs.

"The tax checkoff has recovered slightly from the decline of the early 1990s, but it is still significantly lower," said Randy Wilson, section manager of the Wildlife Commission's Nongame and Endangered Wildlife Program. As a result, state officials have had to seek out alternate funding including federal and private grants to keep existing projects operating.

But the check-off contributions still provide the major financial support for the projects. "The Nongame Program still needs the continued support of the people of North Carolina to continue what we have been able to build in the program's history," Wilson said.

Make your tax-deductible donation through the income tax checkoff or directly to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

Helps Save Taxes, Family Land

Conservation Easement Booklets on Sale

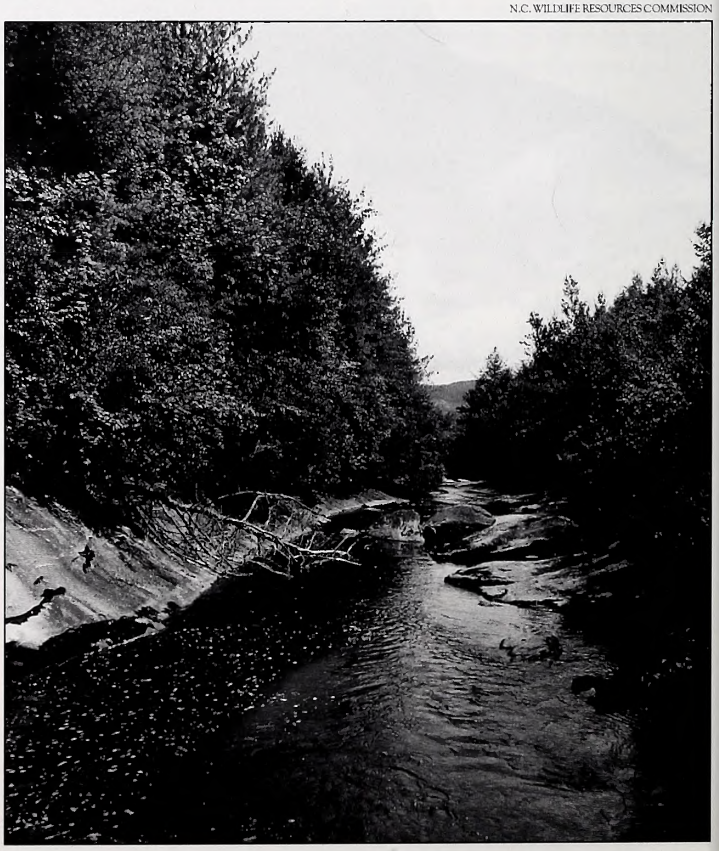
Many landowners want to save the natural and rural character of their property, but the present tax structure often makes this a difficult or financially impossible task. One of the best ways available to protect land is through conservation easements. These agreements permanently restrict potential land uses that might damage significant environmental and historic resources. Easements provide landowners with assurance that their property will be permanently protected and their income taxes, estate taxes and, often, property taxes reduced.

The Conservation Trust for North Carolina—a private, nonprofit organization that is helping communities and private landowners protect important natural and rural lands—has completed several publications explaining the use of easement agreements for land conservation and historic preservation purposes.

The two guides help explain conservation easements and their advantages for private landowners. The first is a simple 16-page "Conservation Easement Introduction" pamphlet, and the second is a more detailed 38-page guidebook titled "Conservation and Historic Preservation Easements." Costs are $1.75 for the "Easement Introduction" and $6.50 for the "Easements" guidebook (mailing costs and sales tax included). Discounts are available for orders of multiple copies by conservation organizations and public resource agencies.

For more information or to order, contact The Conservation Trust of North Carolina, P.O. Box 33333, Raleigh, N.C. 27636, (919) 828-4199.

N.C. WILDLIFE RESOURCES COMMISSION



Sawyer's Creek

Camden County Gets New Boat Ramp

BODIE McDOWELL

***More than 30 people** showed up Dec. 2 at Sawyer's Creek beside Grandy Primary School in Camden County for the dedication of a two-ramp public boat launching area that provides access to the Pasquotank River. Cutting the ribbon were (left to right) Wildlife Commissioner Maughan Hull; Ken Winslow, past president of the Camden County School Board; and Samuel Shaw, chairman of the Camden County Board of Commissioners. The Wildlife Commission built the ramps and floating dock on land leased from the school board. The handicap-accessible area has 21 parking spaces and is the 170th public boating access maintained by the Wildlife Commission.*

Leasing Has Drawbacks

Dear Wildlife,

Having lived in North Carolina almost 20 years, the arrival of your magazine is like a letter from home. I noted with great interest your December article on leasing hunting rights. This painted a very positive view of leasing hunting rights in North Carolina.

In Montana, though, the feelings are not so positive. Huge blocks of land have been leased by landowners to those with enough money to afford the hunting rights. The rest of the state's hunters must use decreasingly available private land or put more pressure on government land.

While I would never deny a landowner the right to lease his or her land, it can have huge impacts on hunters if enough landowners do so. North Carolina may never find this to be the difficult issue we have, but I thought residents ought to know that in some places it is a growing cause of concern.

—Dave Byerly
Lewistown, Mont.

Our Natural Heritage

Thanks for the Memories

Dear Wildlife,

I have been subscribing to *Wildlife in North Carolina* for a number of years and the first thing I always do is look to the inside cover and read the *Our Natural Heritage* column. The topics covered always bring back fond childhood memories.

Like putting out my equipment and setting the clock to chase elusive wood ducks. Or the summer nights spent on creek banks, sliding down the trails to the water in hopes of finding the cane reed pole shaking like crazy from a 2-pound catfish.

I can remember fishing the old ponds, getting on top of a bream bed and catching them until I ran out of worms. And going to Core Banks every Thanksgiving to chase trout up and down the beach in that old car that didn't have any brakes. We just drove into the side of a sand bank to stop.

Things sure "ain't like they used to be," but you have helped keep a big part of my youth remembered. And I often think after reading one of the columns, "I can't wait until I can show my kids what it's like to do that." We often feel it's no use trying to educate our kids in the old ways, but it is. Thanks.

—Steve Coats
Albemarle, N.C.

Check Us Out

Looking for some wild entertainment? Join deer, waterfowl, fish and much more on the N.C. Wildlife Resources Commission's new online web site.

Loaded with information for educators, sportsmen and wildlife enthusiasts, the new site is designed to meet the needs of a variety of computer users.

Check out Wildlife Online at **http://www.sips. state.nc.us/Wildlife/ConservationEd/** and watch us grow.

Catch Us at These Numbers

1-800-662-7137
to report violations of hunting and fishing laws.

1-800-628-3773
(NC VESSEL) for boat registration and titling.

1-800-675-0263 for hunting dates and shooting hours for migratory game birds.

1-888-248-6834 (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.

1-800-446-8663 (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through December 1996

Principal Balance
$23,435,631.36

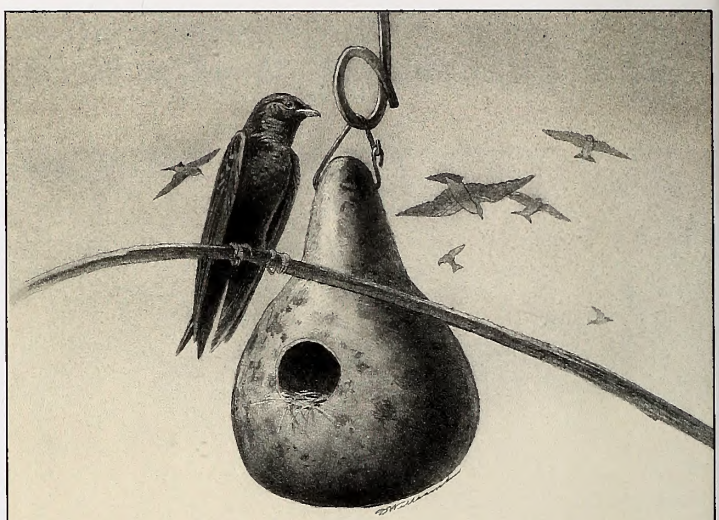
Interest Earned
$21,519,690.55

Total Receipts
$44,955,321.91

Interest Used
$10,049,660.04

Fund Balance
$34,905,661.87

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission, programs, the principal remains invested to generate additional interest for the future.



Time for the Birds

by Rodney Foushee

The appearance of tender leaves and early blossoms is a good hint spring is upon us. But for many backyard birders, it's the arrival of migrating songbirds that marks the true break from winter. That makes March an especially busy time to make final preparations before these feathered friends arrive.

Hummer Time: Despite the chill in the air, this is an excellent time to set up hummingbird feeders. Many people simply wait too long, not realizing that the big male ruby-throated hummers first arrive in March. The females and smaller hummingbirds will soon follow. But with natural nectar scarce this early, a dose of prepared sugar water can really recharge these birds after a long flight from Mexico and Central America.

Martin Invasion: Now is also when purple martins first arrive in North Carolina making it a fine time to set up those martin houses and gourds. But don't stop there, be a good landlord. Martins require fairly high levels of calcium and grit in their diets, especially when raising a family. Treat your colony right by providing them with crushed, dried chicken eggshells.

Just make sure the feeding platform is elevated to prevent attacks from cats.

Bluebird Boxes: Just because bluebirds are year-round residents doesn't mean they should be neglected. March is a good time to put up new nest boxes and clean out old ones. Make sure boxes are placed at least 100 yards apart: adult bluebirds can be mighty territorial.

Boxes should also be mounted at about eye level on metal poles with predator guards to prevent snakes and raccoons from getting a quick meal. After the chicks have left the box for good, clean out the old nest to boost the chances for a second and third brood in the same season.

Wildlife Commission Spotlight

Nongame and Endangered Species: *Partners in Flight*

Many species of migratory landbirds, like the scarlet tanager, are thought to be declining across all or part of their range. Loss of habitat — breeding and winter habitat — is an important cause, but there are many others. Because the reasons for declines in migratory land birds are complex, the solutions are likewise complex and will rely on management practices on public and private lands.

N.C. WILDLIFE RESOURCES COMMISSION

North Carolina Partners in Flight is coordinated through the Wildlife Commission's Nongame and Endangered Species program. One easy way to support research and management activities that conserve migratory birds is with a tax-deductible donation to the Nongame and Endangered Wildlife Fund. Make your contributions through the checkoff on the state income tax form, or give directly to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh N.C. 27604-1188. The sights and sounds of springtime depend on us all.

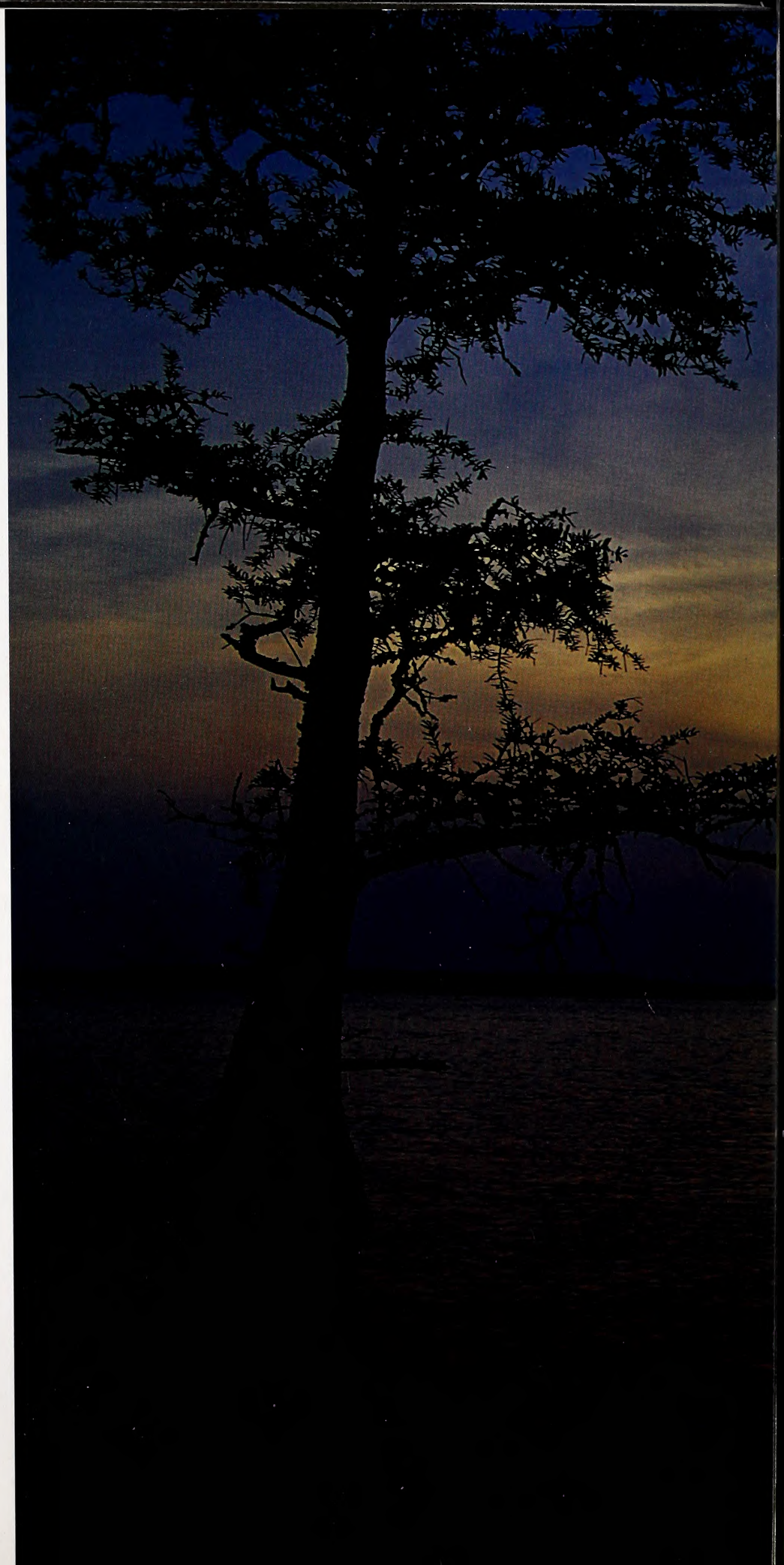
NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

SCARLET TANAGER / DAVE MASLOWSKI

"Partners in Flight" is a dose of preventative medicine. Its goal is to maintain populations of forest and grassland migratory birds through the Americas through habitat protection, management, professional training and public education. The N.C. Wildlife Resources Commission has designated a full-time coordinator to help organize and maintain the Partners in Flight program in the state.

You can help migratory birds by learning all you can about them and the problems they face. Join a bird-watching club, frequent local nature center programs on birds, or develop your backyard into a year-round oasis for birds and other wildlife.

MELISSA McGAW



Early-Season Angler

Despite lingering chilly nights, bass can feel the warming water and they're thinking about spawning. Bass fishermen are thinking about, well, fishing. During the pre-spawn period, bass begin to move into the shallows to look for likely areas to spawn. This wading angler has got it all figured out.

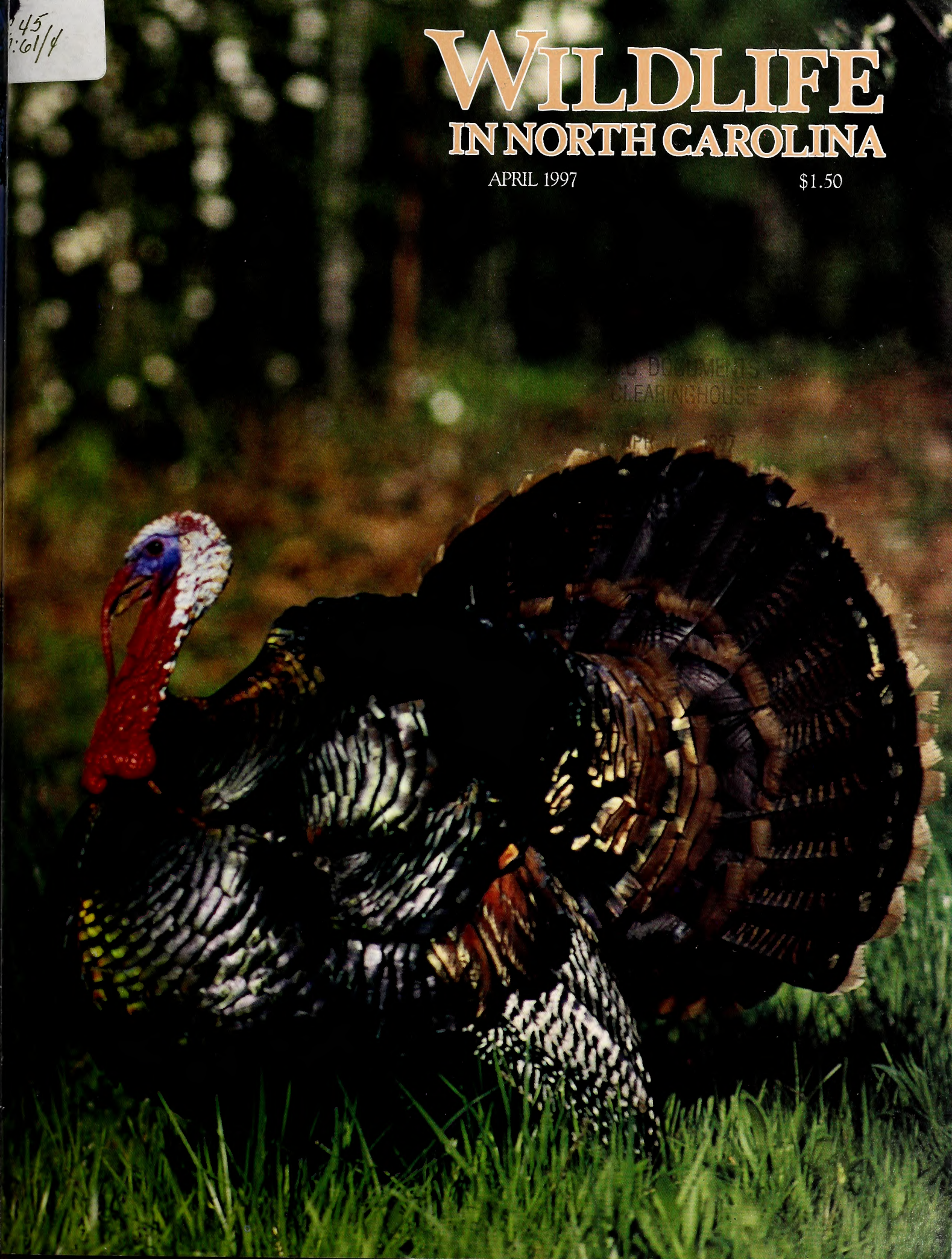
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

45
1:61/4

WILDLIFE IN NORTH CAROLINA

APRIL 1997 $1.50



U.S. DOCUMENTS
CLEARINGHOUSE

When Mickey Meets Vickie

by Jim Dean

Have I told you about Vickie? Interesting character, Vickie. Like a lot of us, she's got a few problems she's dealing with. Of course, she wouldn't call them problems, but then she doesn't talk about these things. I know about them, though, and since Vickie isn't her real name, I can probably get away with telling you.

apologies to Mickey

ILLUSTRATED BY JACKIE PITTMAN ©1997

Vickie's father left home before she was born, and nobody's seen hide nor hair of him since. He was a bit of a rambler, so nobody is really surprised. "It's what they all do," Vickie would probably say, except I doubt that she thinks about it much now, especially with all the other stuff going on in her life. Actually, her mother hasn't been all that much better. She ran off with someone when Vickie and her sister and two brothers were still teenagers—left them pretty much on their own to raise themselves. Never sent any money, and saw them only occasionally.

Things aren't all that swift with Vickie's siblings, either. They never got along well, scrapping all the time. One of her brothers has some dread disease that is sure to be fatal. It's contagious, too, so he's under quarantine awaiting the results of tests. Vickie can't even visit him. Not that she would, most likely, but it's a burden to have that kind of thing in your family, even if you aren't close.

It might be easier to accept if her other brother hadn't turned out the way he has. The last Vickie knew of him, he had moved to the city and become one of those more-or-less homeless transients, wandering around and sleeping anywhere he could. It wouldn't shock Vickie to hear that he'd been begging food or, Heaven help us, raiding garbage cans just to survive. Well, he always was a strange one, staying out all night and sleeping most of the day. He could be a charming rascal, but you figured he could get mean in an instant. Wouldn't surprise me if he caught a bullet someday.

To tell the truth, Vickie's sister is headed down the same road. Many think she's cute, but she's already got her brother's disposition, and she wears way too much eye makeup. Considering the company she keeps, it wouldn't shock any of us to find out that she's contracted the same disease her brother has.

I guess it's not any big surprise that Vickie has turned out the way she has. She's a piece of work, for sure, strutting around with this attitude that the world owes her a living. Bold, is what some would call her. She's got this thing about political correctness—wears real fur and couldn't care less what you think about it. Hey, I'm not going to tell her any different. Why you'd hardly believe some of the things she does. Eats quail eggs. Says they're her favorite. How pretentious is that? And talk about looking cheap. Her sister isn't the only one who gobs on the eye liner. When Vickie goes out in that fur with her eyes blackened halfway around to her ears, some say she looks like a danged raccoon.

Of course, that's because Vickie is a raccoon. And so is her rabid brother, and the rest of her family. (How long did it take you to catch on?)

This story is an example of what is called anthropomorphism, a term Webster's Dictionary defines as "ascribing human characteristics to nonhuman beings." We humans have been doing this for years, populating our culture with charming and utterly irresistible animal characters like Toad, Winnie the Pooh, Bugs Bunny, Mickey Mouse and hundreds of others. It doesn't seem to matter that it's a bit arrogant of us to reinvent the universe in our image. It's all in fun, we rationalize, and certainly that's true. There'd be less laughter to share without the antics of Sylvester, Tweetie and all the others. And, surely, we know that real animals don't think, speak and act as we do. Or do we?

Some people believe that such cartoon characters are contributing to our growing ignorance of the true nature of animals. Kids don't have to believe these characters are real to learn compelling—and dead wrong—lessons from them. Have Elmer Fudd and The Big Bad Wolf helped teach us to despise all predators (including human hunters)? Is it Bambi's fault that so many people are sentimental about cute creatures—only cute ones, of course—in an ecosystem that has zero tolerance for sentiment? Did gentle Mickey foster the notion that nature cares what happens to individual mice? Have all these lovable characters helped condition us to routinely confuse sound biology with moral choices? Is that why eating meat and wearing fur are social issues? Could be.

And what about Miss Vickie? She's not your typical Toonville type, is she? In fact, Vickie is anthropomorphic in name only. If you're a raccoon, the life I've described is normal, and there's nothing disfunctional about her family, either. The trouble is it's not very funny.

So how about we get Mickey a blind date with Vickie?

April 1997
Volume 61, Number 4

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

N.C. DOCUMENTS CLEARINGHOUSE
APR 4 1997
STATE LIBRARY OF NORTH CAROLINA RALEIGH

CONTENTS

4 Team Up for Turkeys
written and photographed by Gerald A. Almy ©1997
A buddy can be a real asset when hunting spring gobblers. Here are five ways teamwork can help you bag that tom.

10 Trout Worth Waiting For *written by Jim Dean*
photographed by Jim Dean
Anglers are cheering the new delayed-harvest trout fishing regulations because they're providing great fishing even in marginal streams. It's sorta like having your trout, and eating them, too. Only later.

14 Flies, But No Flyrod *written and photographed by Jeff Samsel* ©1997
Weighted flies, especially streamers, may catch more trout if you fish them using your spinning rod. It's a deadly tactic, and perfectly legal.

18 N.C. CATCH for Kids *by Celeste Wescott-Maus*
Educators are bringing the classroom outdoors by using N.C. CATCH, the Wildlife Commission's fun-filled aquatic resources education program.

22 Small Game Part II
What's Next for Rabbits and Quail?
written by Carl Betsill and Terry Sharpe
photographed by F. Eugene Hester ©1997
In our November issue, biologist Carl Betsill gave a frank appraisal of the serious problems facing small-game populations and their disappearing habitat. In Part II, he and biologist Terry Sharpe team up to talk about the future—what's being done, what can be done.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

Back of the Book *by Rodney Foushee*

Wildlife Through the Year *by Rodney Foushee*

Cover *A gobbler struts his stuff in the spring woods. Photographed by Lloyd B. Hill.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, P.O. Box 29607, Raleigh, N.C. 27626-0607. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

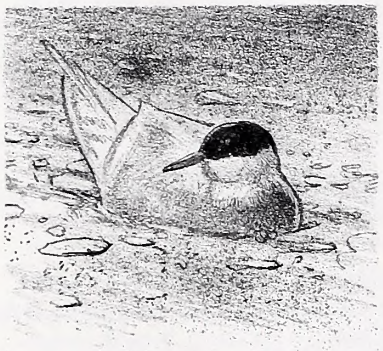
Master Builders

written by Lawrence S. Earley/illustrated by David Williams

If you'd like to build a house for your family, you might want study the birds. Or you might not. Depends on the species, you see. A tern just lays its eggs on the beach, trusting that the clamor of dozens of other terns and the camouflage of its shell material will keep the eggs and subsequent chicks from being singled out. A mourning dove will toss a few sticks on a branch and hope for the best, which usually means no wind stiffer than a spring zepher.

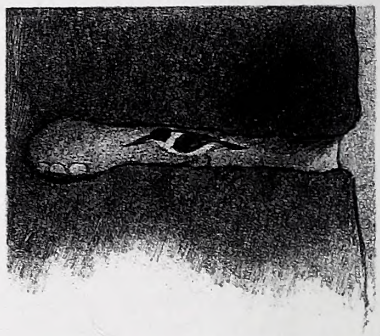
Many birds, on the other hand, are master builders and dazzle us not only with their architectural skills but also their understanding of materials. Where would hummingbirds be without their knowledge of lichen, for example? And how could an ovenbird build its oval-shaped nest on the ground without sensing the resilience of grass, bark and dried leaves?

Birds are instinctive architects. But their works, like their colorful plumage, their useful beaks and their gladsome songs, reflect the diversity at the heart of nature.



Ground nester. *A least tern lays its eggs on a bed of broken shells and other beach debris.*

Platform nester. *The mourning dove (also eagles and ospreys) prefers a flat surface for its eggs.*

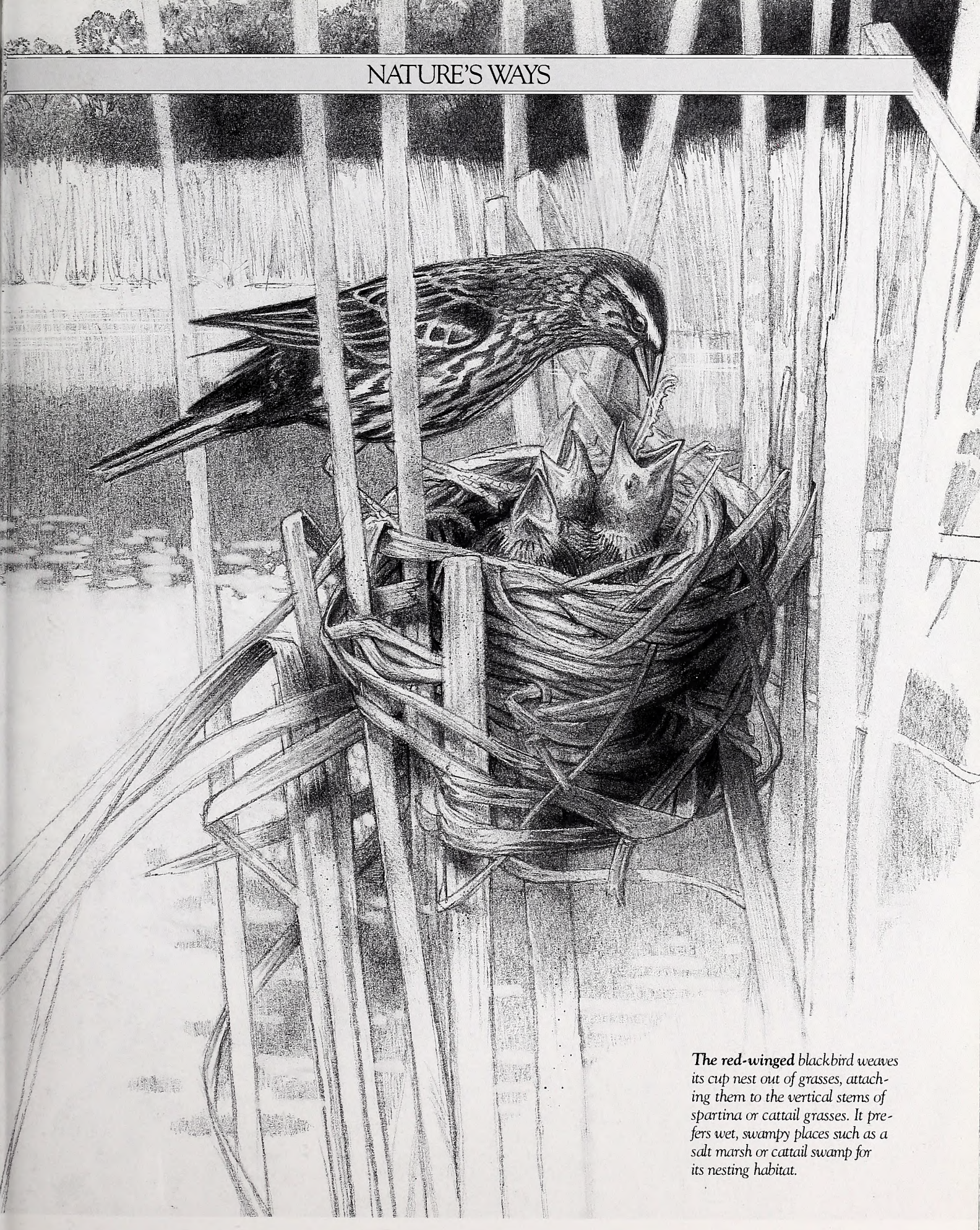


Tunneler. *The kingfisher, a tunneling bird, lays several eggs in a nest which it digs in a river bank.*

Cavity nester. *The pileated woodpecker digs its cavity in the softened wood of a dead tree.*

Camouflager. *A parula warbler uses the hanging tresses of Spanish moss for its nest.*

Cup nester. *The red-eyed vireo suspends its cup nest from the fork of a small branch.*



***The red-winged** blackbird weaves its cup nest out of grasses, attaching them to the vertical stems of spartina or cattail grasses. It prefers wet, swampy places such as a salt marsh or cattail swamp for its nesting habitat.*

Team Up for Turkeys

A buddy can be a real asset when hunting spring gobblers. Here are five ways teamwork can help you bag that tom.

written and photographed by Gerald A. Almy ©1997

Half a dozen gobblers sounded off from their roosts as gray dawn illuminated the spring-brightened mountains. It would be hard to ask for a more auspicious start. But somehow, two hours later, as the harsh light of midmorning bore down, Jim Clay and I were still birdless.

We had called one of the gobblers part of the way to us, but unfortunately he had stopped 75 yards out and wouldn't come any closer. Later in the morning another gobbler answered Jim's calls lustily, but then we heard hens at his side and weren't surprised when he didn't come to us. The other four birds we'd heard simply stopped calling moments after sunrise.

It was an all-too-typical morning in the turkey woods. But rather than call it quits, as I expected we would, Clay insisted we try one more spot. After driving a short way, then hiking into the new area, Jim yelped coarsely on his Perfection mouth call. Before he'd finished, two toms broke in with thunderous gobbles barely 200 yards away.

This time we decided to do things differently. After moving quickly to a nearby knoll, we split up. I settled with my back against a thick-girthed oak closer to the birds, while Jim took up a position 30 yards behind me.

Clay called again, and the reply was louder and closer. Silence reigned for the next 10 minutes, then suddenly the brilliant blue-and-red head of a gobbler popped over the crest of the hill. The bird paused there, focusing on where Jim was calling from. The gobbler apparently thought the hen was 50 or 60 yards away at Jim's location.

From my position, though, the half-puffed-out tom was barely 20 steps away. With my 12 gauge already aimed where I had expected him to appear, I adjusted my aim slightly and squeezed the trigger. The 18-pound tom col-

***Often, two or** more hunters working together (above) can boost their chances for drawing wary spring gobblers in close. One hunter moving around while calling at a distance can sometimes help steer a big tom right into his partner's lap.*

***The proper use** of turkey calls is an important aspect of most team hunts. Hunters who use different calls at different locations can sometimes fool wary toms.*

lapsed on the brown bed of oak leaves as a second bird, which I hadn't seen until then, raced madly away. While focusing on Clay's calls 30 yards behind me, the toms had been totally unaware of my presence.

That hunt many years ago was one of my earliest lessons in the benefits of hunting turkeys with another person. I'd hunted gobblers for several years before that on my own, locating a few birds, calling to several, actually getting one in close enough that I *could* have killed it if I'd known more about what I was doing. (As it was, I somehow managed to lure that bird to within 30 yards and never even got a shot off.)

After a couple of trips with Jim Clay and Tom DuVall—they make Perfection turkey calls—I learned more than I had in years of struggling on my own. On our second hunt, I bagged the nice gobbler described above.

Of course, going out with another, more experienced person is valuable in any type of hunting when you're a novice. The veteran can quickly show you the ropes and demonstrate all kinds of subtle things that would take you years of trial and error to learn on your own.

But in spring turkey hunting, there are also many other practical reasons to hunt with another person even after you've become experienced. Teaming up with another hunter will allow you to bag toms that otherwise might be impossible to kill.

I still venture into the woods on my own quite often, because there is no thrill quite like challenging a tom in spring using your own savvy and skills. But many of the turkeys I have taken simply couldn't have been harvested without teamwork.

Here are five specific ways you can work on tough toms with a partner this spring.

Positioning one hunter ahead of the caller. The hunt described at the beginning of this story is the classic way for two people to team up to bag a gobbler. This allows you to overcome one of the most common stumbling blocks to harvesting a spring tom—having it hang up 20 or 30 yards out of shotgun range. Some people buy a 10 gauge to try to overcome this problem, but that really extends your range only 5 to 10 yards past a 12 gauge.

Here's a better bet. Set up with one hunter positioned 15 to 50 yards closer to the tom than the person doing the majority of the calling. When the person farther away is imitating the hen, the tom is more likely to focus on his location and may not notice a hunter positioned closer as he works his way in toward the call.

During my early hunting years I had several fine callers call in birds for me this way. As my turkey vocalization skills grew, I

began trading off, and now I sometimes get to call in the gobbler for other hunters.

It's acceptable for the shooter to do a small amount of calling while the bird is still far away. Indeed, this might make the tom think there are several hens trying to lure him in. Generally, though, it's best to have the person in back do most of the calling. The only time I like for the lead person to call is if the bird is strutting or slightly hidden by brush. In these cases a quiet cluck or purr might get the tom to step into the clear or extend its head up out of the strut position and improve the chance for a clean kill.

How far ahead to place the front hunter depends on how thick the cover is, how close you can approach the bird, given often-limited time, and how experienced the lead hunter is. A novice should stick close to the caller. A more experienced hunter can range out farther. But remember, one step too close to the tom and it's all over. Always err on the side of caution. If the bird wants to come, another few yards won't deter him.

For safety's sake, stay within sight of each other. The hunter doing the calling in back can carry a loaded gun but should ensure that the safety is on and be especially careful. Occasionally the tom will make a loop as it comes in, going out of range of the hunter in front while appearing off to the side where the caller can safely shoot it. This doesn't happen often, but it does occasionally.

Float calling. The second two-man approach I've had good luck with is dubbed "float calling." Kelly Cooper, a former Master's Invitational World Champion caller, showed me this technique on a hunt we took several years ago. I've had it work on numerous other occasions since.

The day he demonstrated it to me was a cold spring morning. We heard a lone tom gobbling loudly from the roost as the first hint of dawn illuminated the mountains. We approached as close as we dared in the open woods and came upon a small clearing that looked as though it might be the tom's strutting area.

At this point Kelly whispered the strategy to me. I was to sneak up 30 yards or so closer, find a good tree and sit back against it with my gun over my knees. Once he saw where I was positioned, he planned to drop back farther away where he would be totally out of sight of the approaching tom and do the calling. However, instead of taking up a permanent stand, he would move around. That's why he had to hang far enough back so that the tom couldn't see him.

Staying anywhere from 50 to 200 yards behind me, Cooper called from different locations to represent a real hen moving through the woods.

"No hen ever sits stationary in one spot for an hour," he had explained the evening before, "yet that's what a lot of hunters do, and they expect a gobbler to come to them. By moving, I can more realistically duplicate the way a hen would be calling as she

***Spreading out to** intercept traveling turkeys can sometimes be an effective team tactic when you're not able to call the birds in.*

***A variety of** mouth and friction calls can be used by a pair of hunters to fool lovesick gobblers into thinking several willing hens are near.*

travels through the woods. Another advantage is that I can actually steer the bird to the waiting hunter. If the tom starts to move in the wrong direction for you to get a good shot, I can move the opposite way and turn it toward you."

The technique had sounded great, and now, as the tom gobbled repeatedly, I was seeing it in action. After perhaps 60 gobbles from the roost, the tom finally flew down and began calling even more violently. As the bird approached, though, it veered off high on the ridge and might have missed my position. Sensing this, Kelly moved the opposite way and called more urgently. The bird altered its course and came back toward me.

Calling on both mouth and friction calls, sometimes simultaneously, Cooper steered the big tom right into my lap. After it cleared a stand of saplings, I aimed at the head and neck and squeezed, dropping the 19-pound gobbler at 30 yards.

It takes an experienced hunter and caller to manipulate a bird the way Cooper did. And for safety's sake, that person should never plan to shoot, since his job is to keep moving and calling until he works the bird into the stand hunter's lap.

Two hunters split up, both calling. This is a technique few hunters use, but several friends and I have worked this tactic successfully on numerous occasions. One recent example is particularly memorable.

My partner had done the preseason scouting and located a tom roosting on a knoll that spilled out into a field on one side, dropping down to a stream on the other.

"The bird sometimes goes down to the creek bottom when he comes off the roost," he told me. "At other times he stays up high on the knoll then heads out into the field. It seems like whichever location you set up in, he goes the other way."

We decided to split up to try to outfox the crafty tom. I set up 150 yards from where we thought the bird was roosting, staying high. My friend went down the creek bottom, in case the tom headed that way. Of course, we knew each other's location, and we were out of range just to be safe.

Within minutes after settling in, I heard the gobble of a deep-voiced bird. At first light a hen call wafted up from the creek bottom, then I yelped softly on my own mouth call.

The gobbler was fired up and answered both our calls, but soon it was clear he had decided to take the high road and stay up on the knoll. Within minutes the gobbles grew louder, and soon I saw the tom. He looked awesome in the dim early-morning light, beard swinging from side to side as he picked his way through the brush. When he cleared the last sapling between us, I squeezed off and the no. 6 shot found their mark. It was the largest eastern gobbler I had ever taken, with long, sharp spurs and a beard just shy of 12 inches.

Even though my friend had located the tom, he wasn't jealous and was truly glad that our double-teaming strategy had paid off.

You don't have to know in advance which paths a bird is likely to travel to use this method. Sometimes, in fact, I use the tactic on birds the first time I've heard them. Usually there will be a couple of routes, based on terrain, vegetation, ease of walking, presence of roads or similar features, that a gobbler will likely travel after he comes off the roost. By splitting up—sometimes even three hunters—you can cover each likely path the tom might take, knowing that at least one of the hunters will probably get a chance.

It's imperative with this method that hunters know everyone's location, so you don't shoot in that direction. The others' calling can also help you pinpoint where they are.

Two hunters calling from the same area. This is another variation on the team strategy. Instead of splitting hunters up in two different locations or staggering one hunter in front of the other, this method calls for two hunters to stay within 30 or 40 yards of each other and *both* use their calls. This approach lets you imitate a group of hens, and this is sometimes more effective than just one person calling from a single location, if both hunters are good callers.

One or both of the hunters can also use a combination of calls simultaneously, such as a mouth and either a slate, push-pen or box. This creates the illusion of a whole flock of hens. Neither of the hunters is positioned out in front of the other, so no one necessarily has the advantage. Whoever gets the best shot takes it. Sometimes a group of gobblers will come in and both hunters will get a shot.

Spreading out to intercept traveling birds. We had been hunting hard since six that morning. It was one of those days when the toms would gobble once or twice, then lose interest. One tom had come within 80 yards of my friend's position but then found a hen just before closing the final few yards.

We were tuckered out and feeling defeated by about midmorning, when I suddenly saw a longbeard in a field. I grabbed my partner's arm and we watched as four gobblers pecked their way slowly through the field, milling around as they went.

We immediately dropped back into the woods and tried a few calls. A couple of gobbler heads popped up briefly, but they soon went back to their feeding.

We both came to the same conclusion: Yes, we would much rather call a tom in than ambush it. But time was running out, and these were awfully nice-looking birds. We dropped down into a creek bottom, walked downstream, then came up through the woods at the far side of the field, where the birds were heading.

We had guessed that they would head

for one or the other corner of the long, rectangular field, but you couldn't cover it all from one position. We split up. Easing through the woods to where we could each see one corner of the field, we took positions against trees and waited.

Several minutes later, I could see the birds working over a small rise in the field, heading our way. We each clucked softly, but it wasn't the calls that drew the birds in. They were just heading our way. As they came closer, it was clear that my partner would be the one to get a shot. When the flock reached 30 yards, Frank's shotgun spoke, and a heavy gobbler with a 9-inch beard went down cleanly.

No, it's not as much fun as luring a lovesick tom in solely on the strength of one's calling, but when the going gets tough, waylaying a group of traveling toms is a good way to save the day. And with two hunters, you can spread out so that it's more likely one of you will be in the birds' course of travel. Just be sure to stay well back out of sight, circling wide as you move to get in front of them. And be sure you know where your partner is and where it's safe to shoot.

Yes, I'll still grab a gun and vest and hike up the mountain by myself most mornings in spring when I want to hunt turkeys. But I don't hesitate to try one or more of these teamwork strategies with a friend. Not only is it often more productive, it's nice to have someone there to share the joy of a successful hunt. Maybe you can even talk him into carrying your bird out for you, though I haven't had any luck with that yet. ⊠

***Positioning one** hunter ahead of the caller can mean the difference between a successful turkey hunt and just another day in the woods. Often, the tom will key in on the caller and fail to notice the closer danger.*

Trout Worth Waiting For

Anglers are cheering the new delayed-harvest trout fishing regulations because they're providing great fishing even in marginal streams. It's sorta like having your trout, and eating them, too. Only later.

written by Jim Borawa / photographed by Jim Dean

An unusual, perhaps even uneasy, scene unfolded on that early March day in 1992. It was unusual in that fishermen had been recruited by the Wildlife Resources Commission to help stock fish in portions of the Ararat River, East Prong Roaring River, Jacob Fork and Nantahala River. Normally the Commission does not provide anglers with advance notice of fish stockings, let alone ask for help in stocking. The anglers weren't quite sure what to expect, because they would be allowed to fish during March, a time when stocked trout streams are traditionally closed to fishing. Commission enforcement officers on hand at the various streams were concerned that anglers fishing these areas might not be able to harvest the fish being stocked. It was, after all, early to be fishing. Commission fisheries biologists were also nervous, because this was a big test of the first really new fishing regulation in stocked trout waters in 20 years. That was the beginning of the first delayed-harvest trout season, but as it has turned out, there was no reason for anyone to be worried: Delayed harvest has been a huge success.

Despite the cloudy, dreary weather of early March—which included snow on the upper East Prong Roaring River—many anglers came out to help stock and later fish these streams. And from what fishermen reported in the months following, they weren't disappointed.

"I've never been able to catch 10 to 20 stocked trout in one trip before," said one. Another called it "a great program." "The fish in this stream are usually caught out three or four days after stocking," said yet another. "Now I know I can come fishing and have a good chance of catching fish." Even local anglers who traditionally trout fish for food appeared to be happy, because even though they knew they had to release all the fish they caught during March, April and May, they would have the opportunity to harvest these fish when the first Saturday in June rolled around. Another surprising thing about the delayed-harvest regulations is that anglers using spinning gear and fly rods were sometimes seen fishing the same pools. It seemed that this new regulation had leveled the playing field for all types of anglers, and everyone was a winner. In the years since, those initial favorable impressions have not faded.

The Wildlife Resources Commission's Delayed Harvest program is still somewhat new to the Southeast and still gaining in popularity. In its simplest terms, delayed harvest means that only catch-and-release fishing for trout with single-hook artificial lures is allowed during the cool months of the year, but in early summer before the water temperatures get too high for the trout to survive, anglers are permitted to harvest the trout. The initial objectives of the program were to provide anglers places to fish where they would have higher-than-normal chances to catch stocked trout and to provide fishing opportunities for stocked trout during March, when most other stocked trout streams are closed. Another goal was to emphasize the catch, not harvest, of trout. It was also hoped that streams under delayed-harvest regulations would provide new anglers with places to practice their skills and have positive fishing experiences while dealing with the frustrations of learning to trout fish. It was all part of a goal to provide diverse fishing opportunities for stocked trout under the Commission's Trout Management Plan.

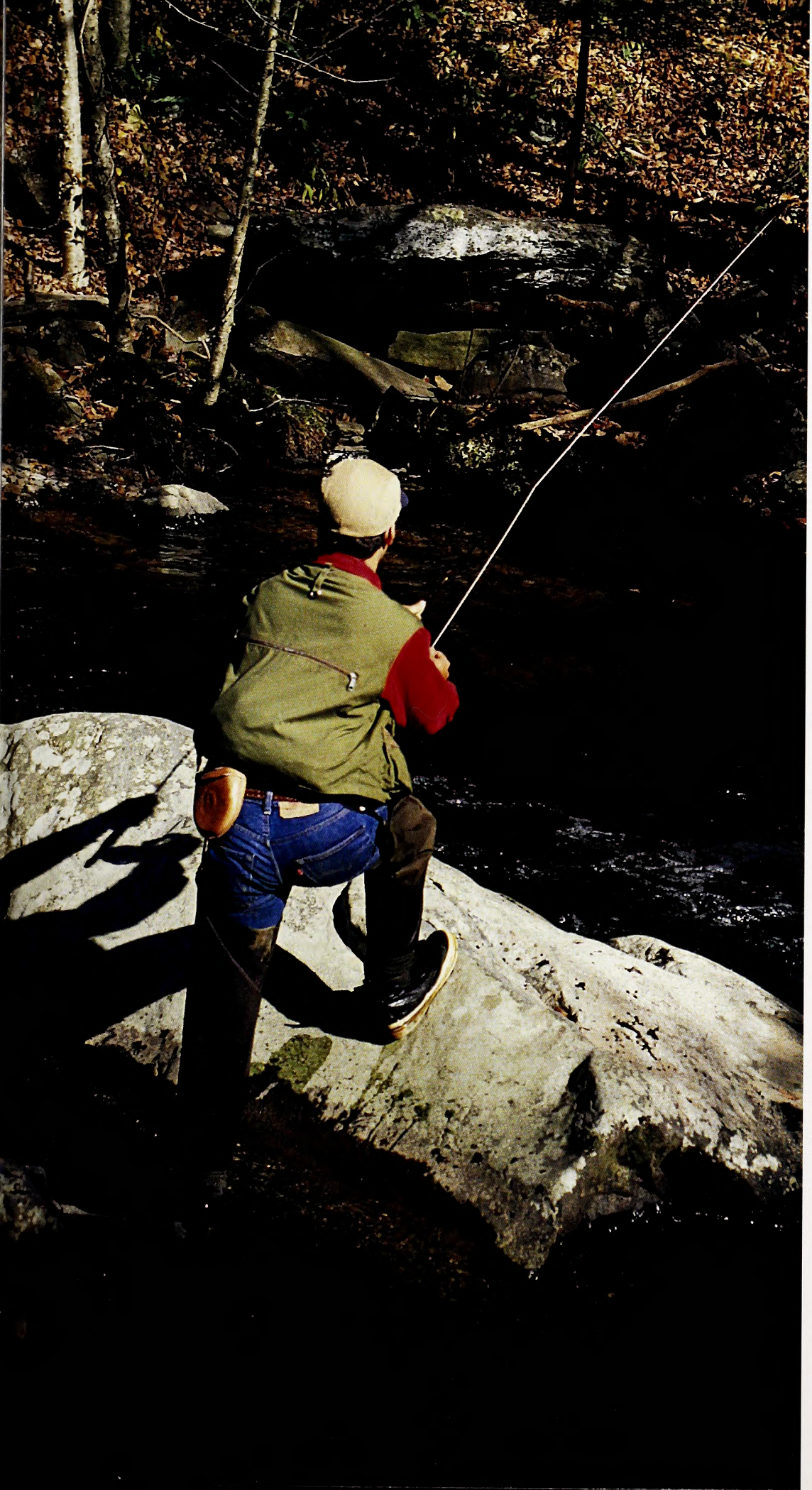
To learn what fishermen thought of the new regulation, the Commission conducted creel surveys on the East Prong Roaring River and Nantahala River during 1992. At the time, the agency wasn't sure what to expect, or how anglers would compare their experiences on the delayed-harvest streams with experiences on adjacent stream sections under hatchery-supported regulations. The results were not only surprising but also showed that almost all anglers liked the new program.

During the catch-and-release period, average catch rates on the delayed-harvest sections varied from three to six trout per hour. Individual catches varied widely, and skilled anglers frequently caught up to 50 fish per trip. Even unskilled anglers usually caught a few fish. On the adjacent hatchery-supported streams, catch rates ranged between 1.9 and 2.5 trout per hour, but catch rates declined quickly as those fish were harvested. Each fish in the delayed-harvest area was caught an average of 2.5 times, as compared to only once for fish stocked in traditional put-and-take areas.

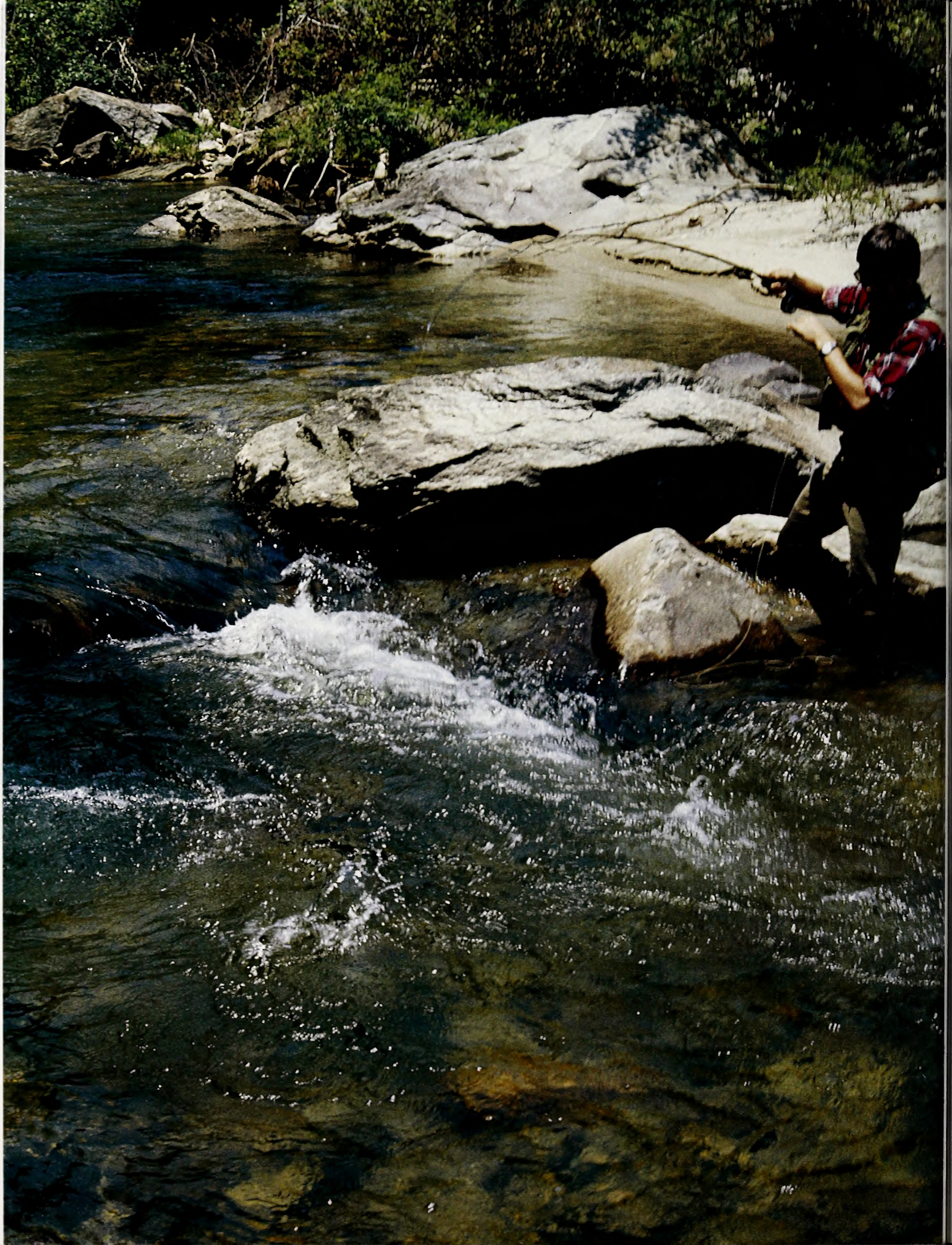
Surveys have revealed that over 90 percent of the anglers using the delayed-harvest areas were over 16 years of age. About 40 percent of anglers used spinner-type lures, while just over 50 percent used artificial flies.

Releasing Trout to Catch Again

Because trout in delayed-harvest waters will be caught and released several times, anglers can help maintain the quality of fishing over the entire season by minimizing injury to the fish. When a fish is hooked, you should enjoy the fight, but don't play the fish too long. This will prevent the fish from becoming exhausted, and it's particularly important during warmer weather. When landing a fish, it is best not to remove it from the water. If possible, remove the hook using small long-nose pliers or forceps while the fish is still in the water. If the fish is hooked deeply, so that removing the hook might kill the fish, snip the leader as close as possible to the hook and release the fish. Use a landing net for larger fish to keep them from flopping in shallow water or on rocks, but be careful in handling the fish, because fishnets can remove the protective slime from fish. To revive an exhausted fish, hold it gently with its head into the current until it is able to swim off on its own.



Scott Dean stalks *an early-season trout. Until recently, many of the trout in stocked streams under general regulations were kept, and fishing was often poor after the first few weeks. However, fishing remains excellent in streams that have delayed-harvest regulations because all trout must be released from Oct. 1 until the first Saturday in June.*



Delayed-harvest streams also attracted more anglers from outside the local area than did hatchery-supported sections. Slightly over 50 percent of anglers fishing the East Prong Roaring and Nantahala rivers were from surrounding counties. Most surprising, however, was that 16 percent of anglers fishing the Nantahala River were from other states.

In an effort to gauge angler opinion of the delayed-harvest regulation and to determine its effectiveness in creating better fishing opportunities, anglers were asked to rate their fishing trips. Over 75 percent of anglers stated their trips were good or excellent, while less than 10 percent rated their trips as poor. Most anglers fishing stream sections managed for put-and-take trout fishing rated their trips as only fair to good.

While most of the information collected concentrates on the catch-and-release season, a lot of anglers continue to enjoy these areas after the streams are opened to harvest. On stocked streams managed under hatchery-supported regulations, most anglers find it difficult to catch many fish a week or so after stocking. Such is not the case on delayed-harvest streams. Here the number of fish ready for harvest on the first Saturday in June remains high, because no fish can be harvested during the catch-and-release period. In 1992 the Commission estimated that only about 50 percent of the fish stocked in spring were caught during the two weeks following their opening to harvest. Thus, some good angling should exist during this time, and, as a bonus, fishermen are able to keep the fish.

The overwhelming acceptance and popularity among anglers of the new delayed-harvest regulation has calmed the initial concerns of Commission enforcement officers and biologists who were worried that fishermen might not like the concept, or that there might be unforeseen problems. Almost immediately after the first season ended, requests to add additional delayed-harvest streams were received from fishermen. By 1995, 10 waters were in the program, and there was still interest in improving the program. Rather than add additional streams, however, Commission biologists at this point proposed expanding the catch-and-release period to include October through February.

__The delayed-harvest__ concept has been highly popular, and one unexpected bonus is that bait, spin and fly fishermen (left and right) often share the same water, especially during the eight-month catch-and-release period. From June 7 through September 30, fishermen also have the option to keep a limit to eat.

Delayed-Harvest Waters

Ashe County
Trout Lake

Burke County
Jacob Fork—Shinny Creek to lower South Mountains State Park boundary

Haywood County
Richland Creek—Russ Avenue bridge to U.S. 19A-23 bridge

Henderson County
North Fork Mills River—game land portion below the Hendersonville watershed dam

Jackson County
Tuckaseegee River—N.C. 107 bridge at Love Field to N.C. 116 bridge at Webster

Macon County
Nantahala River—Whiteoak Creek to NP&L powerhouse discharge canal

Surry County
Ararat River—SR 1727 downstream to U.S. 52 Business bridge

Watauga County
Watauga River—SR 1559 bridge at Foscoe downstream to N.C. 105 bridge

Wilkes County
East Prong Roaring River—mouth of Bullhead Creek downstream to Stone Mountain State Park boundary

Stone Mountain Creek—falls at Alleghany County line to confluence with East Prong Roaring River and Bullhead Creek

From October 1, 1996 through Friday, June 6, 1997
- Fishing restricted to artificial lures having a single hook
- No trout to be harvested or possessed
- No natural bait to be possessed

From Saturday, June 7, 1997 at 6 a.m. through September 30, 1997
- 7 trout daily creel limit
- No size limit
- No bait restrictions

Please consult the *North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for additional details.

These waters are closed to fishing from one-half hour after sunset on Friday, June 6, 1997 until 6 a.m. on Saturday, June 7, 1997.

This expanded delayed-harvest regulation took effect in October 1996. Creel surveys similar to those of 1992 are being conducted on five of the streams in the program. Biologists will also be studying the survival of the fall-stocked fish. Fish population surveys taken in January indicate that most fish are surviving well and should have spread out and taken on more wild characteristics by spring. It also appears that anglers enjoyed, and made good use of, the first season of fall and winter fishing on delayed-harvest streams. Although cold weather and rain are much more of a problem, on days when the weather is nice and stream levels are normal, anglers don't hesitate to hang out the "Gone Fishin'" sign. In fact, on one warm winter day around New Year's, more than 40 anglers were interviewed on the East Prong Roaring River—all seemingly enjoying the delayed-harvest opportunity despite the time of year.

Spring is, of course, a great time to get out the new fishing gear, enjoy the nice weather and catch some trout. This year, you might want to include one of the delayed-harvest streams on your itinerary. Weekdays are the best time to avoid the crowds and have the best choice of fishing areas, but you don't have to worry about the trout anymore. They'll be there waiting. ⊠

Flies, But No Fly Rod

Weighted flies, especially streamers, may catch more trout if you fish them using your spinning rod. It's a deadly tactic, and perfectly legal.

written and photographed by Jeff Samsel ©1997

It didn't seem to matter what we used. The trout had rejected various spinners, and after we switched to flies, they turned up their noses at our nymphs, too. No insects were hatching to help us solve the problem. I could count a dozen trout in the water before me, but this pool was easily accessible and in a catch-and-release area. These trout had seen our tricks, so I decided to show 'em something different. I replaced the spinner on my ultralight spinning outfit with an olive Matuka streamer from my fly box and pinched a little split shot a foot or so ahead of it. A rainbow walloped it on the second twitch. I've been fishing streamers on spinning gear ever since.

Much of North Carolina's finest trout water, including delayed-harvest stretches, wild trout streams, and catch-and-release waters, may be fished only with single-hook artificial lures. Spinners and spoons are allowed in these waters, with the treble hook trimmed to a single point, but often Carolina's small-stream fish demand a more delicate approach. That's when spin fishermen should reach for streamers.

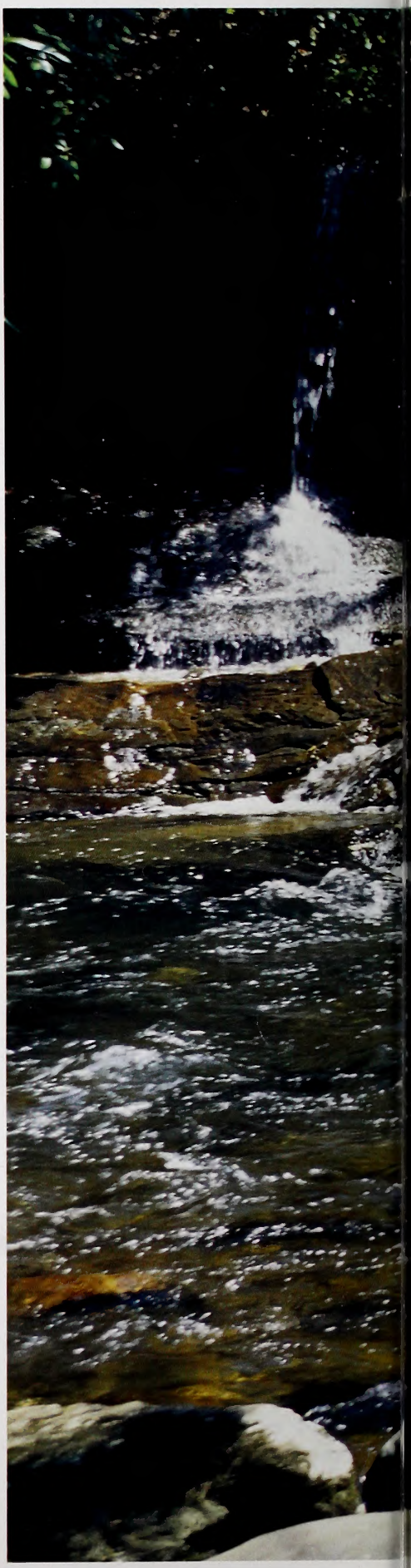
Streamers are long, narrow flies that generally imitate minnows, such as dace or sculpins. But some variations—while not technically streamers—also imitate crawfish, salamanders, leeches and other small stream-inhabiting critters. Although "light as a feather"—like any fly—they can be cast on ultralight spinning gear with one or two split shot added to the line. Some are also internally weighted with lead wire wrapped on the hook shank while they're being made. Unlike dry flies and nymphs, which mostly imitate aquatic insects and attract the most strikes by simply drifting past hungry trout, streamers generally need to be worked.

In many situations, spin fishing offers advantages over fly-fishing for presenting streamers. Extra weight helps them sink quickly in big, deep pools, where brown trout love to hide, but this weight makes casting awkward with a fly rod. Fly casting can also be nearly impossible under the thick canopy of trees and rhododendron on some of North Carolina's finest wild trout streams. Yet, though they are tiny and laurel choked, these high-country waters can still be worked with a 4-foot spinning rod.

Any rod and reel combination that will deliver a very light offering will work for this type of fishing, but shorter rods offer real advantages in tight casting areas. I consider 2- to 6-pound test line ideal. The cobwebby 2-pound thread is nearly invisible even in Carolina's clearest trout waters, but a slightly heavier line offers more strength and a bit of added buoyancy. I usually split the middle and use 4-pound test.

Excellent streamer patterns for Appalachian streams include wooly boogers, wooly worms, Matukas, muddler minnows and sculpins, all tied on no. 6 or no. 8 hooks. Black, olive and brown have been the most productive colors for me. A little flash tied in also seems to work well, especially on bright days and on waters filled with rainbows.

If there are lots of sculpins in the stream you fish, chances are good that they make up



***In deeper runs** like this, it's often highly effective—and legal—to fish a weighted streamer like a Matuka, wooly worm or muddler minnow on light spinning tackle, even though such "flies" are generally associated with fly fishing.*

***Various weighted** streamers and nymphs like these will fool big trout when other offerings fail. You'll be fishing deeper runs and pools near the bottom where you're likely to get hung, so you'll need a good supply of flies to replace those you lose.*

a decent part of the trout's diet. A sculpin pattern or an olive Matuka is a good choice. Likewise, if you see crawfish, try a brown Matuka, wooly worm or some type of crawfish pattern. Muddlers work well for big brown trout, which feed heavily on smaller fish, and wooly boogers are probably the best all-round streamers. For waters known to produce an occasional overgrown trout, a no. 4 black, weighted wooly booger is hard to beat.

The best approach for fishing such flies depends on the character of an individual stream and on the species of trout that dominate the population. If you're fishing for browns in fairly big streams with deep pools, a slow, patient delivery is best. Rainbows in swift, shallow riffles require quick retrieves. Small-stream brookies in pockets that seem too small to hide a minnow tend to jump on a bait as soon as it hits the water.

I think streamers fished on spinning gear are most effective when cast upstream and worked back at about the same speed as the current. I let the stream's flow carry the fly just as it would carry any natural food source, and twitch the rod tip to bring life to the offering. In fast water I often quarter my casts upstream and across, and this allows me to keep the lure active without retrieving too fast.

Subtle motions are the key. It takes only a small twitch to make a streamer look lifelike. Hard jerks will cause the bait to jump unnaturally, spooking trout before they ever have a chance to become interested. With each twitch of the rod, the streamer darts up or hops, and then the weight pulls it back down. A fuzzy streamer with a very small weight is fairly buoyant and will nearly suspend in the current. Most trout simply cannot stand to leave it hanging there.

If you are getting most of your strikes toward the end of a drift on quartering casts as you're working the streamer back against the current, try fishing downstream. In well- defined feeding lanes, the best tactic can sometimes be to simply hang your fly downstream in the current. The water rushing around it will create a nice wobble, and an occasional twitch of the rod tip may draw a jarring strike.

For small high-country streams, the approach is quite similar to fishing a tiny spinner for wild trout. Only short casts are possible, and a quiet approach is more important than exact presentation. The secret is to cast the streamer upstream of a hole without spooking the trout and let it drift into the pocket. When something small bops past a hungry Appalachian trout, that fish is apt to nail it.

Good spots don't have to be deep pools. Streamers need only inches of water to work effectively, and often the finest feeding lanes are not in the deepest holes. Rainbows will hold in any stretch with current, and every trout seems to like a pocket to call its own. The key in small streams is to work slowly upstream, staying low and out of water you haven't fished. Make short casts to every spot that looks promising. That tiny pocket that you decide isn't worth a cast is usually the one where you'll spook trout when you wade through it.

On steep stretches of even the tiniest creeks, the water will often tumble through a series of plunge pools. Work these deep little holes thoroughly, trying a variety of approaches. If you can get a cast into the next upstream pool, let your streamer run the falls and follow the natural currents to read those trout that make their living in the wash below the drop. Don't overlook the edges of these pools. Trout will hide against steep banks and let eddies and back currents do the food-service work for them.

In larger trout streams, short casts still often work best. Don't worry about reaching the far bank. You have better control

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

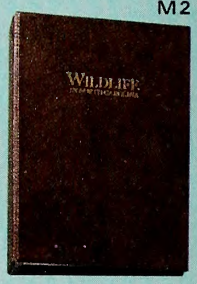
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

Wildlife in North Carolina Magazine

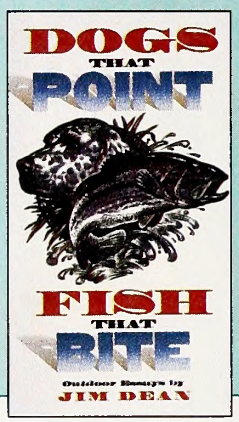
See our easy-order subscription form on back!

- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**

M2

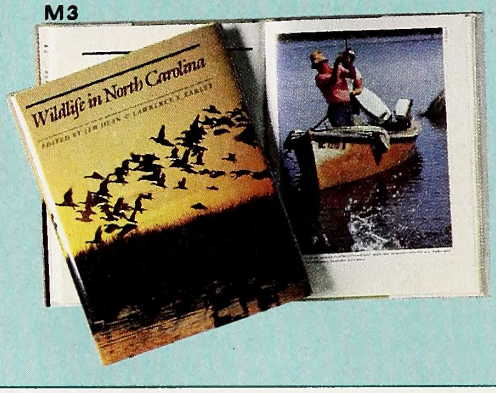


- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**



M8

M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

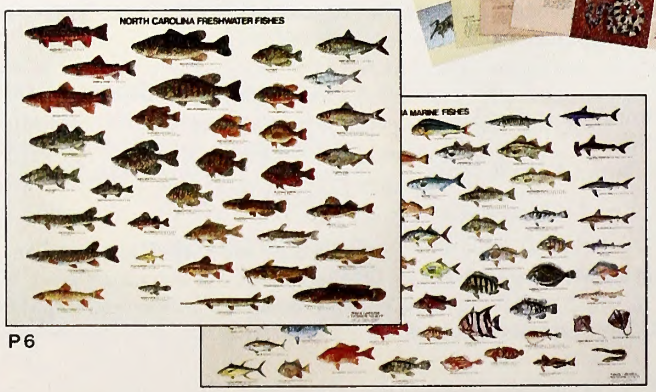
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**



P6

P7

- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

MAGAZINE SUBSCRIPTIONS

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip _____ - _____

MAGAZINE GIFT SUBSCRIPTIONS

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

_____ Magazine/gift subscriptions **TOTAL**

EDUCATIONAL MATERIALS

WS97

Name _____ Home phone (___ ___) ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____ - _____

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL**	$
Discount (subtract 15% discount for **retail** orders of $100 or more)	$
Sales tax *(N.C. residents add 6% sales tax)*	$
Educational materials **TOTAL**	$

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

	PRICE
☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands)	$250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine	$100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires____/____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

♻ *Printed on recycled paper*

N.C. Wildlife Endowment Fund

of a streamer fished close. Pitch your fly into pockets on your side of the river first, before fishing to more distant spots. And don't ever pass a deep, undercut bank without running a streamer beside it.

Streamers on spinning rods are ideal for fishing undercut banks, because all trout like these spots, and brown trout cherish them. Flip your fly into the current so that it will carry it against the wall, or back under the bank in the eddy, if there is one. Then let the split shot carry your offering down. It's worth losing an occasional muddler or Matuka to get deep underneath the bank. Try several casts into such a hole, varying your angle and your retrieve.

Large, deep pools deserve similar attention. The first dozen casts may yield no hint of a single trout's presence, but the next could yield a beautiful wild brown. It's not uncommon for serious streamer fishermen to work the same pool for 20 minutes or more. Fish big pools from head to tail and top to bottom, but concentrate on the bottom.

Many pools beneath higher falls hold strong circling currents under the surface. In such spots, a lightly weighted streamer will do its best tricks when you do nothing but cast it into the current. Watch the line carefully for any twitch, just as a fly fisherman does, and hold on tight when you set the hook.

If that doesn't work, weight the line more significantly and dredge the bottom, where trout see few flies or spinners. Bump the bottom like a bass fisherman works a worm, and be very patient. You will lose streamers this way, but the likely rewards are worth it. On the bottom you're fishing for bigger trout, so tie on your biggest bugs.

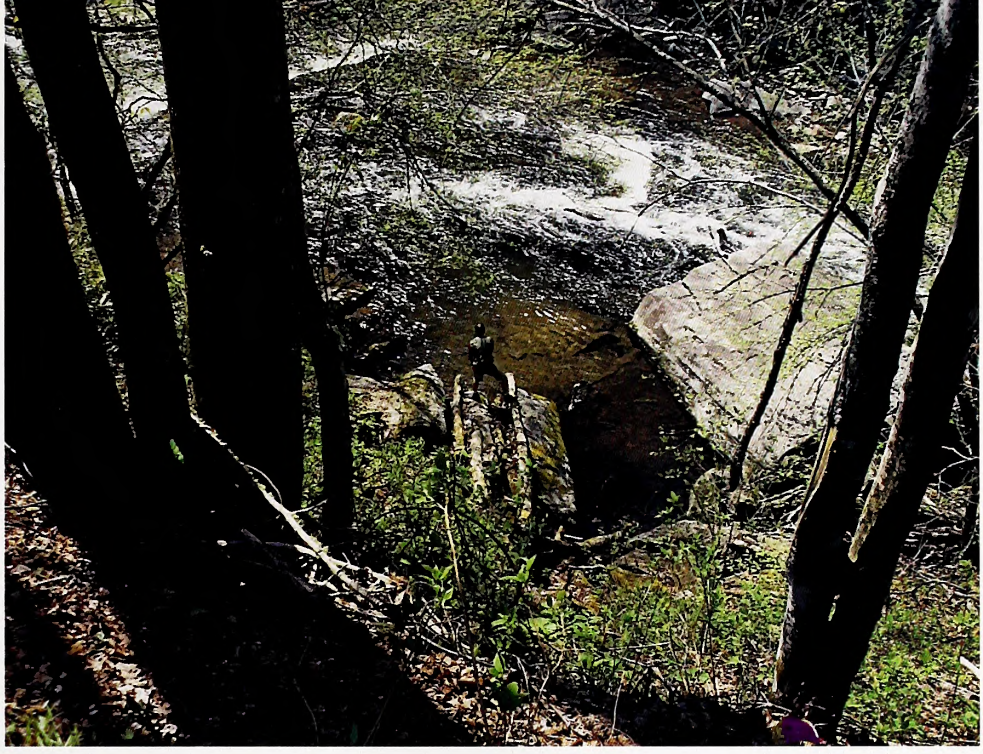
In valley streams, a fairly active approach is necessary. Lazy currents don't carry streamers fast enough, so you have to work your lure with both rod and reel. Holding areas for trout are also less recognizable than they are in tumbling waters. When you can't see the boulders that hold the fish, you have to be thorough and hope to draw the trout out.

Add an extra split shot and make longer casts to work flat, broad trout streams. Experiment with different angles and speeds, but generally angle your casts upstream or slightly across and work your streamer fairly close to the bottom. Try tiny twitches, longer pulls and even a steady retrieve until you learn what the trout like best any given day.

For pulling fish from hidden cover, bright-colored streamers sometimes do quite well. They are more visible from farther away than their natural-colored counterparts, so they serve as attractors rather than imitators of anything in particular. Large valley streams also tend to be more turbid than waters farther upstream, increasing the need for high visibility.

The various types of streamers are extremely versatile, but to catch trout with them consistently, you must be versatile, too. I like to carry a good variety in several sizes, styles and colors. Vary the weight you use and try different speeds of retrieves until you learn what the fish are hitting. Sometimes it may pay to "match the hatch" of prey species you see, just as fly fishermen do with their surface offerings.

In addition to imitating many natural trout foods, a weighted fly on light spinning tackle gives trout a new look. Even in waters where such streamers have been used, a Wooly Booger behind a split shot has a distinctively different appearance from one drifted or stripped by a fly fisherman. If you're lucky, it will look like dinner. ⊠



***A spinning rod** has several advantages over a fly rod for fishing weighted streamers and nymphs. You don't have to worry about tangling your backcast in the trees, and the light monofilament line makes it easier to fish deeper pools like this one.*

Single-Hook Artificials Only

Learning techniques for fishing single-hook artificials, whether streamers, spinners, spoons or something else, opens tremendous opportunities for North Carolina trout fishermen. A peek into the regulations shows that several broad categories of streams, including a large portion of the state's finest trout waters, may be fished only with this type of lure.

Wild Trout Waters

Beyond 40 stretches of stream specifically listed in the *Regulations Digest*, all designated trout waters located on game lands that are not classified and posted otherwise are considered wild trout waters.

Catch-and-Release/Artificial Lures-Only Waters

These 10 special streams have been identified for extra protection for a reason. They hold outstanding populations of stream-bred trout, including native brook trout in some.

Delayed-Harvest Waters

Nine streams and one small lake fit into this category, which has grown extremely popular during the past few years. From Oct. 1 through the first Saturday in June, only single-hook artificials may be used, and all fish must be released.

Wild Trout/Natural-Bait Waters

Even in these streams, where bait may be used, all lures must have only a single point.

Great Smoky Mountains National Park

Park streams on both sides of the mountains may be fished with a North Carolina or Tennessee license, but they may be fished only with single-hook artificial lures.

N.C. CATCH for Kids

Educators are bringing the classroom outdoors by using N.C. CATCH, the Wildlife Commission's fun-filled aquatic resources education program.

by Celeste Wescott-Maus

Some "fishy" sounds are being heard in school hallways, youth camp recreation rooms and along riverbanks these days. The reason? Adults are teaching young people about some of North Carolina's most valuable assets—its aquatic resources. Also, these young people are seeing that learning can be fun.

Sponsored by the N.C. Wildlife Resources Commission's Division of Conservation Education, N.C. CATCH (Caring for Aquatics Through Conservation Habits) is an interdisciplinary, supplemental conservation education program for adults interested in teaching young people about aquatic habitats and recreation. The program's materials, activities and experiences are aimed at helping young people understand North Carolina's aquatic habitats and fisheries and also at helping to develop positive outdoor ethics. The program also offers information about water safety and recreational activities that include fishing and responsible stewardship. In 1995 N.C. CATCH received a first place award in the International Association for Conservation Information's annual competition of North American educational programs.

To participate in the program and receive its materials, adults must complete one of the free N.C. CATCH instructor training workshops offered year-round across the state by education specialists from the Division of Conservation Education. The workshops vary slightly in length. Those who complete a ten-hour workshop can receive a Continuing Education Unit (CEU) from the N.C. Department of Public Instruction as well as credit toward Environmental Educator Certification from the N.C. Office of Environmental Education.

The program's teaching materials include the comprehensive *N.C. CATCH Instructor's Guide* and *N.C. CATCH Student Handbook*, and also supplemental posters, a video, a fish identification card and a fish mobile. N.C. CATCH materials are adaptable and appropriate for middle school teachers, curriculum specialists and at-risk/alternative school counselors and teachers. Youth leaders and other educators such as scout leaders, recreation therapists, park personnel, camp counselors, fishing and wildlife club members, and 4-H leaders can also profit from the instruction and materials.

After training, participants may order annual supplies of the student materials as needed. All the materials can be adapted to meet specific educational goals and objectives and can be used as individual teaching

KEN TAYLOR

N.C. CATCH *creates excitement through interdisciplinary, hands-on activities. These students are discovering that all kinds of creatures may exist within a simple aquatic ecosystem located in their schoolyard.*

tools; the program units can be taught separately; or materials and units can be used simultaneously as a total program. Through the use of this flexible design, N.C. CATCH offers limitless educational opportunities for use at ponds, lakes, rivers, wetlands, estuaries, the Atlantic Ocean and in indoor settings.

Currently, N.C. CATCH targets 10- to 12-year-olds, but it can be easily integrated and adapted for other age levels. The program's objectives are met through three instructional phases. Completing all three phases in sequence is the most effective way for a student to enjoy the program, but this is not always necessary. Within phase 1, young people receive the entire program's overview through four teaching units, entitled "Fish and Their Habitat," "Conservation and Outdoor Ethics," "Fishing Equipment and Skills Practice," and "Aquatic Field Trip/ Fishing Clinic." Several indoor and outdoor hands-on learning activities create interest and understanding about North Carolina's freshwater and saltwater ecosystems.

Phase 2 concentrates solely on learning more about fishing equipment, fishing lures, terminal tackle and fishing skills. Phase 3 provides N.C. CATCH students with opportunities to use their new knowledge and skills through participation in outdoor field experiences. This outdoor experience can be a fishing clinic, an aquatic field trip or a combination of the two.

Workshop participants are responding enthusiastically to the program. "N.C. CATCH is one of the best programs I use in my teaching," says Louise Strickland, a sixth-grade teacher at Southern Middle School in Alamance County. Strickland has been using the N.C. CATCH program for over five years. "Every year for a few weeks, we put away our science books and use the N.C. CATCH student handbooks as our text. I am able to tie in all of my state required teaching objectives for environmental studies plus a great deal of useful hands-on activities to enrich and enhance student learning."

Strickland also stresses that parents especially like the N.C. CATCH program because students keep the handbooks and fish identification cards at the end of the classroom sessions. "I have one former student, now a junior in high school, who still asks 'How's the fishing?' and proceeds to tell me how his fishing is going," says Strickland. "He had never fished before he experienced it in my class! I cannot say enough about this program. I only wish they had programs like this when I was in school."

N.C. CATCH is designed to reach

CATCH

North Carolina Wildlife Resources Commission

Using N.C. CATCH in the Community

North Carolina educators have been remarkably creative in using the N.C. CATCH program. The following are just a few of the program's many possibilities.

- N.C. CATCH is part of the camp agenda of the Fur, Fish 'n' Game Rendezvous held annually at Camp Millstone near Ellerbe. Boys and girls are introduced to a variety of outdoor skills and topics including biology, water safety, fishing and aquatic habitats.

- A day of N.C. CATCH activities and fishing experiences has become an annual event for Cherokee Indian 4-H youth, their parents, volunteers and staff. For some, this experience is an in-depth study of fishing as part of the Native American culture.

- Around the state, college and university campuses utilize N.C. CATCH training as part of their classroom methods preparation for preservice teacher training and the North Carolina Teaching Fellows program. Training through an N.C. CATCH workshop prepares the potential teachers with field-tested and effective materials and hands-on activities that can be utilized during their student teaching and for successful teaching careers.

- Teachers and counselors utilize N.C. CATCH with at-risk youth. These children and young adults are seeking personal successes and relationships with the natural world. N.C. CATCH provides educational training to meet school objectives and goals, as well as opportunities to reflect quietly on nature and its bountiful lessons through fishing experiences that become a natural outlet for extracurricular activity.

- Some of North Carolina's state, county and city park staff are using N.C. CATCH as parts of local educational outreach efforts, including resource partnerships with local schools and fishing events during National Fishing Week.

- Cub and Boy Scout and Girl Scout leaders are using N.C. CATCH to enhance troop meetings and scout activities and to meet badge requirements and recognitions throughout the various levels of scouting.

- The Make-a-Wish Foundation has used the N.C. CATCH program in granting the wish of several terminally ill children to enjoy the recreation of fishing for the first time. This event was held at Badin Lake and hosted by racing legend Richard Petty.

- The N.C. Central School for the Deaf has used N.C. CATCH to reach youth who are otherwise limited in their aquatic experiences and to teach them about habitats and recreational experiences many of us may take for granted.

- For the Randolph County Schools and Cooperative Extension Service Discovery Program, N.C. CATCH has been part of an overnight outdoor experiential teaching program. The program allows N.C. CATCH-trained teachers and other resource staff to use hands-on activities before, during and after the scheduled overnight events. The N.C. CATCH program and materials enable principals, teachers, parents, county agents and other resource volunteers to work together to create a successful teaching experience for the county's fifth graders.

- The Johnston County Wildlife Club works closely with the Johnston County Schools by providing space and a pond to host N.C. CATCH training workshops for teachers and volunteers. In addition, the wildlife club offers its clubhouse, property, and pond as sites for N.C. CATCH-trained educators to use with their young people for aquatic field trips and/or fishing clinics.

- The YMCA facility Camp Sea Gull uses N.C. CATCH as part of its summer programs and school outreach. The camp has allowed trained teachers and camp staff to use its stocked ponds for their classroom or camper group's activities.

MELISSA McGAW

***From posters to** a video (above), from worksheets to outdoor experiences, N.C. CATCH materials provide plenty of opportunities to learn about this state's aquatic ecosystems. Students learn an important lesson about hypothermia through the N.C. CATCH activity entitled "Cool Hand Luke" (left). By picking up pennies out of a cooler of ice and water, students experience and discuss the serious consequences of hypothermia, and the precautions needed to avoid it.*

children regardless of physical or mental limitations. Edward F. Pryor, assistant principal at Lynn Road Elementary in Raleigh, has been using the N.C. CATCH program with his special education classes for the past five years. "N.C. CATCH is a wonderful way to differentiate instruction to meet the needs of our students," he said. "The many activities and the integrated approach to academic subjects such as science, ecology, writing, physical education, and recreation excite and motivate our students.

"In addition, our aquatic field trips have provided opportunities to involve parents, volunteers from N.C. State, and other adults from the local community in our school's program. Our students have also benefited from the direct involvement of the Wildlife Commission's Conservation Education Division and the U.S. Army Corps of Engineers at Falls Lake. Our N.C. CATCH unit is truly a school/community project as well as the most exciting and fun way imaginable to learn!"

Brucie Lee, the Nature Program Coordinator for the Greensboro Watershed Parks, says, "N.C. CATCH provides a basic foundation for children to understand aquatic education concepts while they are having fun. It's one of the most useful resources available to nonformal and formal educators."

Lee uses the program with her educational adult and youth programs at Lake Higgins. Through the Division of Conservation Education's regional education specialists, she recently received N.C. CATCH training during the North Carolina Park Ranger Training School. Visiting park rangers from around the country were impressed with the thoroughness of the aquatic program and its interactive features. Many states have used this program as a model for their respective state's aquatic education programs, publications and educational outreach efforts.

Louise Strickland also emphasizes the character-building skills offered by N.C. CATCH. "I saw an amazing new spark of interest in one child I taught—my son," she says. "He used what he learned about rods and reels to do a demonstration for 4-H at the district level, and he helped give a program for the local Rotary Club on the N.C. CATCH program. The club, by the way, then donated 15 rods and reels to our school program. He also helped instruct other classmates during the fishing part of our study, and he became an avid fisherman."

Making conservationists and anglers out of young people is a lasting legacy of N.C. CATCH. This is important at a time when fewer and fewer students have the opportunities to take part in traditional outdoor experiences such as sport fishing. Anne Hice, the Wildlife Commission's Northern Piedmont Education Specialist, sums up the differences between the experiences she had growing up and those of today's youth.

"One of my fondest memories of growing up in southern Guilford County is being around our farm ponds and those of neighbors. Most of the time we took a cane pole and some worms. We didn't really care about catching a trophy fish. A lot of our visits were to cool off after putting in a barn of tobacco. My children never lacked for someone to take them exploring and fishing at these ponds. Their papa or grandmother usually was available as a companion.

"Today, times have changed. Most kids don't have the benefits of living on a farm, and many farm pond owners restrict or prohibit access and fishing. Extended families are uncommon, and there's a lot more development and concrete. But after attending our N.C. CATCH instructor's workshop, adults are more comfortable with taking a child fishing. They're also a lot more knowledgeable about the need for clean water, the abuse of our waterways, and safety around the water.

"If kids don't know about the world they live in and how dependent and fragile life is," says Hice, "they won't care about the natural world today or tomorrow."

Adults who want the satisfaction of teaching young people to explore and conserve North Carolina's aquatic environments should get involved in N.C. CATCH. Teaching kids to "Care for Aquatics Through Conservation Habits" is how N.C. CATCH can make a big difference. ⊠

For more information, contact N.C. CATCH, Division of Conservation Education, N.C. Wildlife Resources Commission, 512 North Salisbury Street, Raleigh, N.C. 27604-1188, (919) 733-7123.

N.C. CATCH *can be easily adapted to meet the needs of groups with differing skill and knowledge levels. The program also encourages community involvement in aquatic field trips and fishing experiences for youth.*

N.C. WILDLIFE RESOURCES COMMISSION

What's Next for Rabbits and Quail?

written by Carl Betsill and Terry Sharpe / photographed by F. Eugene Hester ©1997

The November 1996 issue of Wildlife in North Carolina *featured Part One of a two-part series on small game titled "The Truth About Rabbits and Quail?" In that article, N.C. Wildlife Resources Commission biologist Carl Betsill discussed some thought-provoking reasons for the decline in small game. He also explained why he felt the many programs implemented by this and other wildlife agencies had failed to halt these declines. That article should be required reading for anyone who cares about the welfare and future of small game, especially rabbits and quail. Now in Part Two, Betsill and small-game specialist Terry Sharpe team up to tackle tough questions about the future of small game and what is being done to help. Equally important, they tell sportsmen what they can do to help.*

What's next? Now that wildlife managers have a better grasp of the problems facing small game, what steps and programs should we undertake? The answers are, of course, tied to the past. Clearly, small-game managers should continue to use programs that have worked and discard those that haven't. It's also clear that it will pay to stick to sound principles of management and avoid what might seem to be the "magic bean." This is the role we see for the N.C. Wildlife Resources Commission.

We know that providing the right habitat is essential in restoring any wildlife population to the numbers we desire. This is basic "first grade" stuff to a wildlife manager. But do we now have the right habitat for quail in North Carolina? For the most part, the answer is no. We know this from our general observations, and we now have solid research conducted here in North Carolina that confirms this fact. Since we know this, we now know where to direct our programs. So what kind of programs will work to restore quail habitat?

We know we have to think bigger than we have in the past. Based on studies and past experience, the Wildlife Commission is now developing a broad-scale approach to habitat management. If you ask for technical guidance on improving small game on your farm these days, you won't hear much talk about food plots and which "magic bean" to plant. Instead, our wildlife biologists will probably be more interested in discussing tillage practices or crop residue management. Biologists are now spending more time in meetings with local agricultural leaders discussing state and national farm programs rather than delivering seed and mapping where to put food plots.

These changes in management are part of the reason we are cautiously optimistic about the future of small game. Indeed, research conducted since 1990 has paid off. We now know considerably more about the quail and rabbit problem than we did at the beginning of this decade. We have a great challenge ahead of us. New farming legislation and economic pressures to reduce fuel and pesticide consumption promise significant changes in farming practices within the next decade. Instead of trying to get farmers to "leave something for wildlife" as has been done in the past, we have the opportunity to influence programs that save the farmer time and money and, as a side benefit, enhance wildlife habitat. It shows promise of being a classic win-win situation.

Research—What have we learned?

During the early 1970s, quail and rabbit populations were high, and our staff was busy wrapping up the business of restoring white-tailed deer. In fact, North Carolina had enjoyed a decade of unusually good small-game hunting success. Though farming, forestry and land use in general were going through the most rapid and dramatic changes in history—increases in farm size and declines in farm numbers, more efficient herbicides, fescue, rotary mowers, pine plantations, and more housing developments—it took a while for the impact to be felt. No, the declines were not due to poor weather

***With cottontail** populations in decline, some rabbit hunters (above) have been wondering if it's worth the trouble to train and feed a pack of beagles. Quail hunters face the same problem finding enough wild birds to train dogs like this Brittany (left).*

or a dip in the cycle, they were here to stay. Our agency, like others across the Southeast, was slow to discard the programs that had worked so well in the 1950s and 1960s. It was not until the lean years stretched into the early 1980s that the agency began to build programs that would provide a solid base for small-game management in the future. We were learning that the food plots that had been so successful in concentrating the game raised across the diverse farmscape were no longer productive.

The transition from providing food plots to managing landscapes included numerous debates over such varied topics as the planting materials program, foxes and hunting season length. At one time or another, theories about cycles and sunspots, new diseases, and environmental toxins were in vogue. All the while North Carolina's landscape was continuing to change: the Piedmont and Mountain farms reverting to forests, the fields of the Coastal Plain growing larger and cleaner. Fortunately, we made it through the debates of the 1980s with our basic premise intact—yes, habitat is the problem. But it was also clear that our efforts were just not enough to offset the major land use changes going on around us. It was a simple fact of economics. Sadly, there simply were not enough landowners willing to devote the time, money and energy required to manage for species that require early-succession habitat.

During the early 1980s, the Wildlife Commission developed monitoring programs that allowed us to quantify population declines. Now that we could back up our observations with numbers, we could see the world falling apart for small game, but we seemed helpless to make changes. As quail and rabbit populations declined, more and more of our hunters threw in the towel, sold their dogs and picked up a deer rifle or, heaven forbid, golf clubs. Requests for small-game technical guidance declined. By the early 1990s our district biologists were spending progressively less time on small-game technical guidance and more time providing technical guidance on big game or tending to wildlife damage complaints as cities sprawled across the landscape.

The realization that if we are to succeed, we must work more effectively within farming and economic systems came slowly. There were only three basic changes in the program: 1) we needed a better understanding of the problem and what factor or factors are limiting populations; 2) we realized that changes must occur on a big (landscape) scale to make significant increases; and 3) we saw that we must take better advantage of economics and turn small-game management into a money-maker for the landowner.

Timing is everything, and Dr. Pete Bromley could not have arrived in North Carolina at a better time than in 1990. Dr. Bromley, who brought an unusual mix of science, administration, team building, diplomacy and salesmanship, was eager to develop a program through N.C. State University that addressed wildlife issues of significant value to the Commission. He tackled the complex business of the quail decline by building a team composed of wildlife researchers, agriculture researchers, economists and, perhaps most importantly, leaders in the agriculture and wildlife communities.

Bromley's team of researchers began picking apart the complex relationship between agriculture and bobwhite quail. Over a period of years, his team learned that pesticides currently used on North Carolina rowcrop fields were *not* killing our bobwhites. However, clean fields free of insects and weeds left bobwhites without places to nest and raise their young. Less than 1 acre out of 100 on many Coastal Plain farms provided suitable nesting and brood habitat.

In addition to pointing out current habitat deficiencies, Bromley's research provided numerous clues on how to improve bobwhite populations in an economically acceptable, even advantageous, way for the farmer. Through experiments with hand-raised quail chicks, researchers learned that no-till farm fields—in which crops are planted directly into the residue from the preceding crop—produce high-quality quail brood habitat. These were the same no-till fields being promoted by agricultural agencies for saving topsoil, conserving moisture and reducing expenses to the farmer. Researchers found that overhead cover along ditchbanks, especially early in the growing season, is a critical habitat in short supply. This discovery led to a new innovation in ditchbank management technology called "the weed sweep." This controls trees while preserving low cover, promising to save both time and money while significantly increasing suitable nesting habitat on many farms. The research team is currently crunching numbers to determine the real costs of field borders. We should soon know if crop yields on marginally productive field edges actually justify the expense of land preparation and planting.

Phase Two of the research project directed by Dr. Bromley is getting under way on a series of private farms scattered across the Coastal Plain. This study of agro-ecology will examine the installation of best-management practices, including nest-predator control, and their influence on quail and other farm wildlife populations. It will also determine the impacts that implementing best-management practices will have on water quality and farm profitability.

We have concluded that the formula for success and the potential for improving quail populations change as you travel from region to region, and in some cases from farm to farm. Our strategy is to concentrate research on integrating wildlife recommendations into current rowcrop systems in the Coastal Plain, because we feel that a few changes there can pay big dividends. In our estimation, population responses in other areas of the state will not equal those on the farms down east. Still, we have determined where our efforts can have the most impact in other ecosystems and we have implemented programs designed to improve habitat there, as well.

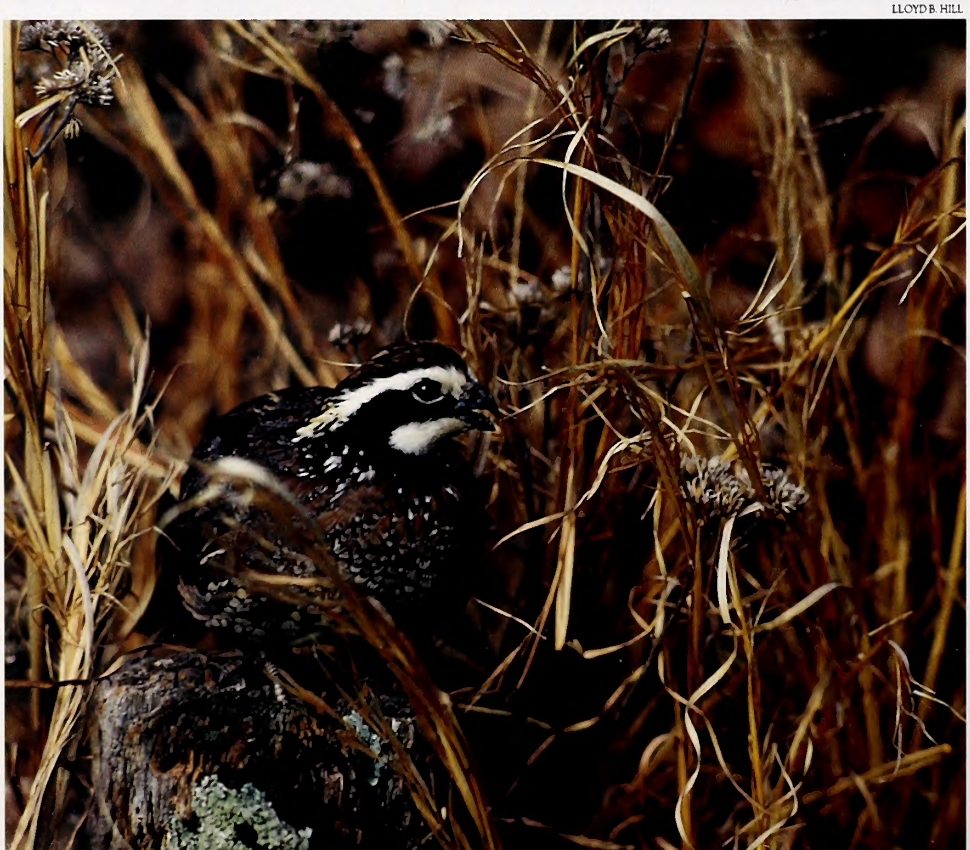
For instance, in the early 1980s we had written off cattle farms as having almost no potential for small game. However, on a trip to a professional meeting in Missouri in 1984, we learned that forage researchers were excited about a group of cattle forage plants collectively known as native warm-season grasses. These grasses, distant cousins to broomsedge, are the dominant components of the tall grass prairies of the Midwest. They once supported vast herds of buffalo, later fed the nation's cattle, and have always provided food and shelter for grassland game birds of the Midwest, including bobwhites, prairie chickens and ringneck pheasants.

A closer investigation revealed that grasses in this same group are native to North Carolina. They were once widespread in frequently burned woodlands and open areas and supported bobwhites, cottontails and grassland songbirds here in North Carolina. These perennial grasses are much less common now due to infrequent disturbance (fire) and past grazing practices. Today we see them as weak stands along infrequently mowed rights-of-way or roadsides. Their structure and growth habit are similar to their cousin broomsedge, and like broomsedge fields, these native grasses provide bobwhites and cottontails with overhead cover and a network of travel ways between clumps. Even when these grasses are managed for grazing or hay, their tall growth habit dictates that they be managed no lower that 8 to 12 inches tall.

Help has also come from Soil Conservation Service specialists Bobby Brock, Keith Salvo and Roger Hansard, along with Jim Green, Paul Mueller and Joe Burns at N.C. State University. They have all had an interest

***One piece of good** news discovered during a recent cooperative study between the Wildlife Resources Commission and N.C. State University is that bobwhite quail do not seem to be directly affected by pesticides. That further confirms the belief that the decline of wild quail is largely linked to lost or deteriorating habitat.*

LLOYD B. HILL



***Homes and other** development are gobbling up prime small-game habitat across the state, particularly in the Piedmont where the long-term outlook is bleak. No-till farming and other new practices hold promise, however, because fields would be left unplowed after harvest, leaving cover and food for small game through the winter.*

in these grasses for their qualities of superior summer grazing and high-quality hay crops. From these experts we have learned that when fescue shuts down for the summer, these perennial grasses are pumping out forage that exceeds by far that produced by other commonly grown warm-season grass forages. Forage experts now recommend that 20 to 30 percent of cattle pastures be maintained in warm season forages, and they tout native grasses as some of the best. Unfortunately, the grasses are somewhat finicky to establish, but North Carolina growers are learning how to establish and manage native warm-season grasses successfully. Landowners who have done their homework and pay attention to detail are reporting good success. Reports of both quail and rabbit use in and around native warm-season grass fields are encouraging, but it pays to keep the big picture in mind. Until use of these grasses occurs on a large scale, no major changes in wildlife populations should be expected.

Though bobwhites are still abundant in landscapes dominated by annually burned open pine forests on quail plantations in the Deep South, the typical North Carolina forest landowner has few quail. Today our typical forest supports a closed canopy and is rarely disturbed. The combination of shade and infrequent disturbance in mature North Carolina forests does not allow the proper groundcover conditions to develop for rabbits and quail. For now, the first few years following a clear-cut timber harvest and reforestation offer the most potential for bobwhites. In keeping with our theme to make economics work for small game, we are joining forces with the N.C. Forest Service and Cooperative Extension Service to encourage thinning of woodlands. This makes sense from an economic standpoint and also increases the groundcover needed by small game. We are also promoting the use of prescribed fire, a tool that has accomplished numerous forestry and wildlife objectives. We are improving habitat through cooperation in the longleaf pine initiative, an effort by numerous agencies to promote the longleaf pine forest ecosystem. When properly managed, longleaf pine forests can provide high-quality forest products and produce excellent quail habitat. By promoting the use of frequent and heavy thinning, prescribed fire, and longleaf pine, we can increase the value of older timber stands for wildlife.

Influencing North Carolina's landscape

Through research and cooperation with experts in the fields of agriculture, forestry and water quality we have identified some major small-game habitat problems and developed some very practical ways to solve them using techniques that at the same time address bigger issues. We feel that we have a solid program based on science and integrated with the major land uses to offer landowners. If land managers behave as we would like, we will have more productive crop fields, pastures and forests, as well as cleaner water and healthy wildlife populations. Only one very big question remains: How are we going to deliver our message to North Carolina landowners?

First, we have to face reality. To succeed, we must be able to blend our programs designed to improve wildlife habitat into

Publications for Landowners and Small-Game Hunters

The Upland Gazette—A newsletter published three times annually for small-game hunters and managers.

Native Warm-Season Grasses for Virginia and North Carolina—Benefits for livestock and wildlife; information on establishing and managing native grasses.

Protecting Our Wildlife Heritage—A 25-minute video featuring three landowners who consider small game when making management decisions. (Available for loan from the State Film Library at (919) 733-4376 or purchase from the Wildlife Resources Commission's N.C. Wild Store at (919) 662-4377.)

Wildlife and Prescribed Burning—An overview of the use of prescribed fire.

Tarheel Wildlife on the Farm—A prescription for the landowner who wishes to manage for small game.

Woodlands and Wildlife in the Southern Appalachians—How forest management decisions influence wildlife populations in western North Carolina.

Planting Food Plots for Small Game—Guidelines to help make decisions about what, where, when and whether you should plant food plots to benefit small-game species.

Commercial Sources for Wildlife Planting Materials—Where to obtain planting materials to benefit wildlife.

North Carolina Rabbits—Natural history and management of the species.

The above publications are available from the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

economically viable farming and forestry practices. Remember, we are looking for landscape-scale changes. We cannot accomplish this broad change by relying on the efforts of one agency or the goodwill of a few farmers. Also, we must recognize that quail and other early-successional species did not get into this condition overnight and that it will take years to turn things around. We are talking about improving things for our children and grandchildren. What better gift could we give our children, than to leave them with more opportunities for enjoying the outdoors and our wildlife heritage than we have now?

Just as our current research program has resulted from opportune timing, it seems that timing may be on our side in other ways. Concerns about water quality, wildlife populations and the environment at the national level have played an increasingly important role in development of our nation's farm policy. Wildlife and conservation organizations were more successful than ever before in building strong conservation measures into the 1996 Farm Bill. Due to strong support from the Wildlife Commission and administration at the state level, we are working more closely than ever before with federal farm agencies. We are helping design cost-share and conservation programs that consider wildlife, specifically early-succession wildlife. We plan to use Farm Bill programs and the system of the local Natural Resources Conservation Service, Farm Services Agency, and Soil and Water Conservation Districts to implement better wildlife practices on North Carolina farms. In January, the Commission voted to accept a proposal by the NRCS to cost share a farm liaison biologist to keep abreast of farm programs at the state level and help guide them.

Our agency is participating locally in every county to influence management decisions that affect wildlife on the farm. By cooperating closely with farm and forest management agencies, we can share our message about field borders, native warm-season grasses and prescribed fire with landowners developing conservation plans or seeking cost-share assistance.

***Quick-fix solutions** like predator control and stocking, even if they were practical and possible, will not overcome vast losses of habitat for quail or rabbits (left). Changes in farm programs and new habitat-management proposals are keys to long-term success, but improvements will take time. Sadly, these beagles (right) may not live to see that potential realized.*

The outlook

We hope we have brought you up to date on what our agency is doing for small game with these two articles. Perhaps this is a good place to try to predict what the future holds for small-game hunters. It's not an easy task. We can sincerely state that the Wildlife Resources Commission's number one game management priority is improving small game. We can also describe all the programs currently under way. The hard part is noting that all of this activity is not likely to make a big difference in hunting during your lifetime.

The fact is that the future of small game will depend more on farm and forest economics, urban growth and development, and highway funding than on anything a small state wildlife agency can do. Our best efforts will probably only assure that the situation will be better than it would if we hadn't tried.

Many hunters are now asking the Commission to forget the studies, the talking and the meetings and take a more direct approach—do what we did for turkeys and deer and start a stocking program. It's an understandable request, especially when you consider that many shooting preserves and quail plantations are having some success releasing quail for the gun. Slow-release techniques, call-back pens and feeding stations have improved survival of pen-raised quail and have eliminated some of the earlier problems with tame birds that were reluctant to fly. The problem is that the success of these put-and-take programs cannot be confused with restoration of a free-ranging and healthy wild population. These programs simulate hunting and have absolutely nothing to do with restoring quail populations. If existing habitat cannot support even a basic breeding stock for quail, we surely won't see long-term improvements by releasing birds (even with the most sophisticated techniques). This is true whether the releases are pen-raised or wild stock. Besides, with put-and-take hunting, a $15 hunting license will not get you much recreation at a conservative cost of $2.50 a bird.

So what can you do? In the first place, don't give up hope. Although the long-term outlook for small game in the Piedmont is not promising, there are still areas where habitat can be improved, and certainly great potential still exists in the eastern part of the state. New farm requirements and changing farming practices, combined with proper management, may yet have significant favorable impacts on small game although it will take time, possibly many years. Changing the way landowners manage their land will not occur quickly, and seeking quick-fix solutions such as stocking will do more harm than good. By joining with other hunter groups such as Quail Unlimited, you can play a part in helping influence favorable habitat, management and research programs to benefit wild populations.

Meanwhile, you will almost surely have to look more aggressively for good hunting areas for wild birds, and you may have to travel farther to reach them. There are successful hunters out there, but they're going to extra trouble to find and track the productivity of cutovers and other prime habitat —and they're more diligent than ever to befriend and help landowners. You may also want to consider joining a club that leases and manages hunting land, or take advantage of guided hunts. For those with limited time and opportunities, shooting preserves can give you convenient opportunities, and help you keep your dogs sharp.

If we're diligent and patient, we may yet see progress in restoring wild small-game populations in some areas. Yet, it serves no purpose to be unrealistic about our current problems, our losses in the Piedmont, and our prospects for change. That's why, as biologists, we have included the bad news along with our hopes. If we can't see the real problems, we can't find the solutions. ☒

Technical Assistance Programs to Improve Small-Game Habitat

Farm Bill Programs

The Natural Resources Conservation Service, formerly the Soil Conservation Service, administers several farm bill conservation programs that offer excellent potential to cost-share or even receive annual payments while implementing practices that improve small-game habitat. Contact your local NRCS office for technical assistance or information on the:

- Wildlife Habitat Incentives program (first sign-up will likely be held in the summer of 1997)
- Environmental Quality Incentives program
- Conservation Reserve program (field borders, filter strips)

Forest Stewardship

The Forest Stewardship Program, combined with the Stewardship Incentives program, is a relatively new program geared toward landowners interested in the long-term improvement of their total forest environment. Participating landowners receive a total forest management plan with input from forestry, wildlife and soil conservation experts. Cost-share for such practices as prescribed burning and timber stand improvement is available. Contact your North Carolina Forest Service county ranger for more information.

Teaming with Wildlife

Teaming with Wildlife is an effort by conservation agencies and organizations across the United States to develop funding for nongame wildlife. The coalition is developing support for legislation that will provide funding for nongame wildlife management based on an excise tax, similar to the long-running and highly successful programs that currently fund much of our game and fish management. At first glance you may ask what a program aimed at nongame has to do with rabbits and quail. However, this team effort will likely provide funding for programs aimed at declining populations of grassland songbirds, and these same programs will undoubtedly benefit bobwhites and cottontails, which depend upon similar habitat conditions. For more information contact the International Association of Fish and Wildlife Agencies at (202) 624-7890 or write Mark Johns, North Carolina Wildlife Resources Commission, P.O. Box 564, Cary, N.C. 27512.

District Wildlife Biologist

If you need help developing a plan to integrate small-game management into your present land management system—whether forestry or farming—a N.C. Wildlife Resources Commission district wildlife biologist is available to help. To contact the appropriate biologist for your region, write the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188 or call (919) 733-7291.

Now You Can Get It Done Locally in Minutes

New Boat Registration System Goes Statewide

Written and Edited by Rodney Foushee

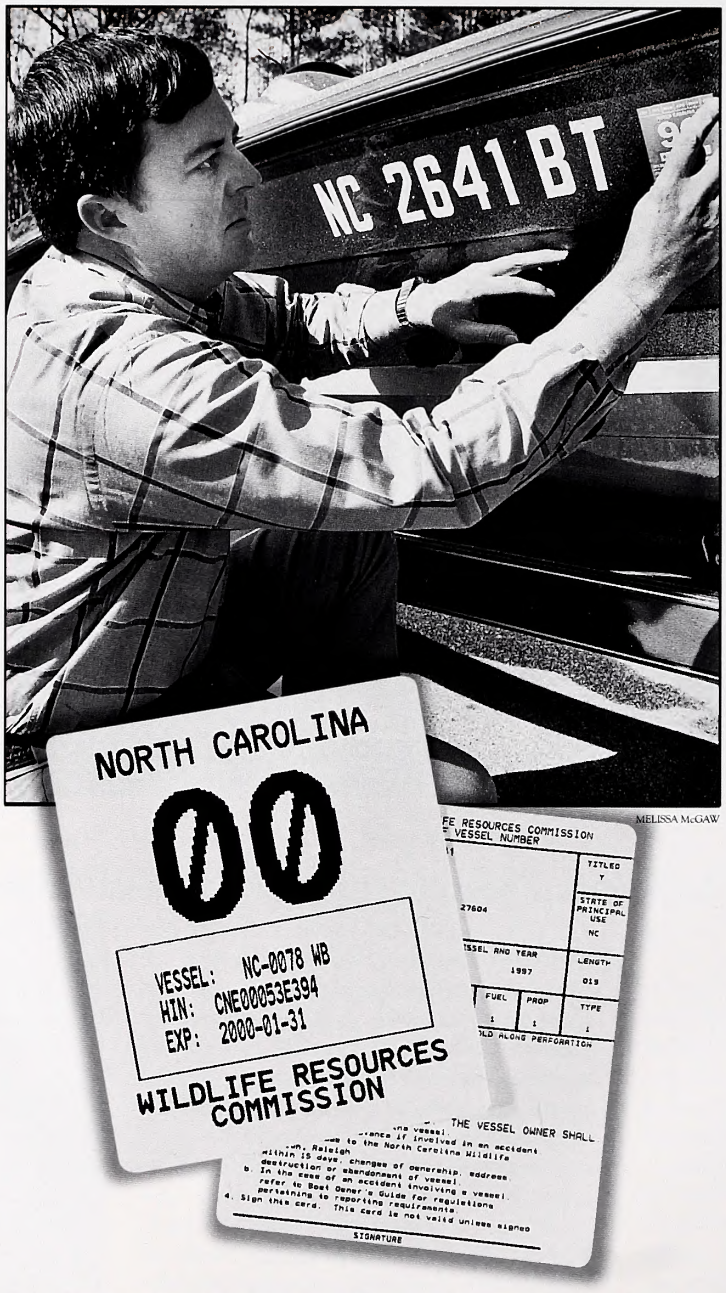
Registering a boat in North Carolina just got a whole lot easier thanks to a new computerized registration system launched by the N.C. Wildlife Resources Commission in March.

The state-of-the-art Customer Support System (CSS) makes registering a boat anywhere in the state as easy as punching a few computer keys. The new vessel registration system took effect March 18 when 400 Wildlife Service Agents went online.

Using a computer the size of a credit card machine, vessel agents at marinas, hardware stores, tackle shops and boat dealerships across the state can register boats and transmit the information to the Wildlife Commission's main office in Raleigh. In seconds, the computer system assigns the boat a North Carolina vessel number, records the information and prints out the registration card and a three-year decal.

"This system makes registering a boat a snap," said Richard Hamilton, the Wildlife Commission's assistant director. "You can walk into a business in your community, pay your money and walk out the door minutes later with the permanent registration card and decal in hand."

That's a far cry from the old registration system used in North Carolina and most other states requiring a boat dealer to mail in paperwork and the owner to wait up to 60 days for a permanent registration and decal. Besides the delay for the owner and the inconvenience of a temporary registration, the old system caused a backlog of paperwork for dealers and Wildlife Commission employees.



MELISSA McGAW

***The Wildlife Commission's** new Customer Support System allows a boat owner to register a vessel locally in minutes and walk out with a permanent registration card and a three-year decal (above). All that's left to do is place the decal and vessel numbers on the boat.*

With more than 316,000 boats already registered in North Carolina—up nearly 20 percent since 1990—renewing registrations for existing boats has become an even greater challenge. The new computer system should alleviate any waiting time for most renewal decals and reduce mounds of paperwork.

Instead of mailing renewal applications to Raleigh, boat owners can instantly renew their three-year registrations and obtain new decals in their own communities. Renewal reminder cards will contain the names of the two nearest Wildlife Service Agents based on the owner's ZIP code, making it easy for the owner to find the closest agent. One-year renewals, however, will still have to be mailed in under the old system.

With the increasing popularity of fishing, hunting and boating in North Carolina, the Wildlife Commission set a priority to develop a system to better serve customers through local license and vessel agents. More than a year in the making, the point-of-sale capability offered through the network of CSS agents is the centerpiece of the system.

"This new system was designed to allow the Wildlife Resources Commission to provide better, more efficient service to our citizens," Hamilton said. "We are confident this is a more effective use of registration and license fees. The added efficiency of the new system will cover its cost by reducing administrative expenses and providing faster collection of fees. There are no plans to increase any existing fees to pay for the system."

The boating registration change is only the first phase of implementing CSS. All hunting, fishing and trapping licenses and permits will be sold through the computer system beginning July 1 when 900 additional Wildlife Service Agents are added to the system, bringing the total to 1,300 agents statewide. Subscriptions to *Wildlife in North Carolina* and other educational products sold by the Wildlife Commission will also be offered through the computer system in the near future.

Events to Coincide with Earth Day

Governor Proclaims April Environmental Education Month

Gov. James B. Hunt Jr. has proclaimed April "Environmental Education Month" to promote a better understanding of North Carolina's valuable natural resources and the impact humans have on them.

"Regulation alone is not the answer to solving all our environmental problems," said Anne Taylor, director of the state Office of Environmental Education which helped organize the proclamation. "Knowledge, understanding and awareness of the natural systems that sustain our quality of life and our state's economy is in everyone's best interest," Taylor said.

Environmental education has become more crucial in North Carolina in recent years as the state becomes less rural. "As we continue to urbanize, we risk losing the sense of stewardship that comes with living close to the land," Taylor said.

To celebrate Environmental Education Month, events have been planned at dozens of parks, aquariums and other education centers across the state. In many cases, the activities have been timed to coincide with Earth Day, an event that first boosted environmental awareness 27 years ago.

While most people now realize that humans have an impact on a global scale, it is harder for them to pinpoint their own contributions. Without increased awareness of the local environment, it's easy for people inadvertently to become part of the problem, Taylor said.

Accordingly, activities for Environmental Education Month will focus on helping North Carolina citizens discover their own local "ecological addresses." Like a street address, an ecological address helps pinpoint where a person lives. But instead of a street name and number, an ecological address includes an area's climate, topography and soil type. One of the most important parts of an ecological address is the river basin, which determines where drinking water comes from and where wastes and runoff end up.

"If people don't even know the river basin they live in, how can they realize the impact they are making on the environment and begin to make positive changes?" Taylor said.

To help North Carolina residents find out more about their ecological addresses, maps of the state's 17 major river basins have been given to public libraries and 120 environmental education centers statewide. The N.C. Department of Transportation has also begun placing river basin road signs in selected areas and several utility companies have started placing ecological awareness information in their power bills.

The overall goal of the education campaign is to encourage people to learn about their environment on their own using existing resources. "Instead of creating new programs, we want to create greater public access to the environmental education resources, both public and private, that are already available in North Carolina," Taylor said.

To learn more about Environmental Education Month activities and environmental education centers near you, call the Office of Environmental Education at (919) 733-0711 or check out the agency's web page at http://www.ehnr.state.nc.us/EHNR/ee.

Hunting Rights

Leasing No Cure-All for Trespassing

Dear Wildlife,

I read your "How to Rent a Deer" article (December 1996) with a cynical chuckle. I feel that the author summed up his problem in his first three paragraphs. Trespassing has been a long-standing problem throughout North Carolina and appears on the rise at an alarming rate.

I belong to two small Granville County hunting clubs that were approached by land owners to lease their property to reduce trespassing as outlined in the article. This last year has been rather dismal because we find ourselves spending more time trying to police trespassers and vandals on the property than we do actually hunting. We have gotten an excellent response from our local wildlife protectors since the land is registered with the Wildlife Commission. But unfortunately this has done little to end all the illegal activity.

I suspect the problem will continue to rise until the General Assembly takes action to significantly increase the penalties for violators. I thank the author for his informative article, but I suggest he also have his property registered with the local sheriff's department. This seems to carry some weight in trying to eliminate trespassers and vandals.

—Dana L. Prokos
Chadbourn, N.C.

Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

April 4-5

The North Carolina Partners in Flight annual meeting will be held at Blue Jay Point County Park in northern Wake County. The two-day event will feature guest speakers along with demonstrations of bird monitoring techniques, wildlife photography and backyard wildlife habitat creation. For more information, call N.C. Partners in Flight Coordinator Mark Johns at (919) 362-9257.

April 18-20

The N.C. Wild Foods Weekend, to be held at the Betsy-Jeff Penn 4-H Center in Reidsville, will feature edible wild plant identification and wild plant and game cooking. For more information, call Ed Kessler at (919) 496-3277.

April 22

Earth Day 1997 will be celebrated on April 22. Check your local newspapers for scheduled events nearest you.

May 3, 10

International Migratory Bird Day will be celebrated May 3 at the WNC Nature Center in Asheville and May 10 at the N.C. Zoological Park in Asheboro. Bird walks, face painting and children's activities focusing on birds and creating backyard wildlife habitat will be featured at both events. For more information, call the nature center at (704) 298-5600 or the zoo at (800) 488-0444.

Outdoors Woman Program

BOW Workshop Set for Western Carolina

KEN TAYLOR

***The goal of the** Becoming an Outdoors Woman (BOW) program is to teach women outdoor skills like hunting, fishing, canoeing and camping in a relaxed, non-intimidating atmosphere.*

Women will have the chance to improve their outdoor skills and knowledge next month when the N.C. Wildlife Resources Commission holds its first Becoming an Outdoors Woman (BOW) workshop.

The workshop, set for May 30-June 1 at Western Carolina University in Cullowhee, will feature a variety of outdoor courses designed to offer hands-on instruction to women in a relaxed, non-intimidating atmosphere. Courses will include canoeing, outdoor cooking, shotgun and rifle marksmanship, motorboat skills, flyfishing, archery, bowhunting, outdoor photography, backyard wildlife watching, map reading, camping, outdoor survival skills, and stream and pond ecology.

"This workshop gives women the chance to try outdoor activities they have not taken part in previously," said Lt. Randy Thomas, the Wildlife Commission's safety coordinator who will supervise the BOW program. "We know each woman attending will enjoy the camaraderie of people who enjoy outdoor recreation."

The workshop is part of a national program to break down the psychological and social barriers that have historically prevented women from enjoying outdoor activities including hunting and fishing. BOW is the outcome of a workshop conducted in 1990 at the University of Wisconsin to examine the reasons why participation of women in outdoor activities is low. The popular program has spread to more than 35 states.

The first North Carolina BOW workshop will be limited to 100 women ages 18 and up. The three-day program costs $160 including all meals and lodging on campus. For more information or to register, call Lt. Thomas at (919) 733-7191.

Field Notes

Wild Turkey (bearded birds only)	April 12-May 10
Hatchery-Supported Trout Waters	Opens April 5
Wild Trout Waters	Year-Round

Information on bag limits and other regulations may be found in the *1996-97 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission.

Wildlife Service Approves Bismuth

The U.S. Fish and Wildlife Service in late January gave final approval to the use of bismuth-tin shot for waterfowl hunting after tests showed the shot is nontoxic when eaten by ducks and geese.

"This is good news for waterfowl hunters," said Acting Director John Rogers. "As always, the Service's intention is to make as many shot options available to hunters as possible while protecting migratory birds from poisoning."

Lead shot was phased out in 1991 for use in waterfowl hunting because it was found to be toxic to ducks and geese that ingest it while feeding. At that time, steel shot became the only legal load for waterfowl hunting.

In response to a petition by the Bismuth Cartridge Co., the Service gave temporary approval for the use of bismuth-tin shot for part of the 1994-95 season and for the 1995-96 and 1996-97 seasons. The company submitted data for an initial, short-term test that showed no toxicity. The company has now completed all required toxicity studies.

In addition to bismuth-tin and steel shot, the Service has given temporary approval of tungsten-iron shot for the 1997-98 hunting season. The Service will consider final approval once the manufacturer, Federal Cartridge Co., completes the required tests.

—Information courtesy of the U.S. Fish and Wildlife Service

Revised Book Aids Prosecutors

A partnership between the N.C. Wildlife Resources Commission and the N.C. Wildlife Federation has enabled the federation to update and republish *The Elements of Selected Wildlife Laws*, a sophisticated aid for the state's prosecutors and judges to better understand hunting, fishing, boating and wildlife management laws.

The book, originally published in 1993, was considered the first such resource in the nation for prosecutors and judges. The book analyzes about 25 North Carolina wildlife laws and is designed to guide district attorneys, magistrates and judges through the complex process of prosecuting wildlife violations. It includes notes on related offenses, exemptions, relationships to federal laws and other details crucial to the fair disposition of wildlife cases.

The book also outlines the use of firearms within the law, the history of wildlife management, the process of mandatory suspension of hunting and fishing licenses and a list of replacement costs for wildlife resources taken illegally. Information for the book was obtained from experts with the Wildlife Commission's enforcement division and the Institute of Government at the University of North Carolina at Chapel Hill.

The updated edition was funded by the Wildlife Commission and the N.C. Wildlife Federation Endowment and Education Fund. It will be made available free to all the state's prosecutors, district court judges, magistrates and wildlife enforcement officers.

It is the objective of the book to create a higher level of awareness and a renewed interest in protecting the public's natural resources and guarding public safety.

1,421 Swamp Forest Acres to Boost North River Game Land

Ancient Bald Cypress Stand Gets New Lease on Life

A stand of virgin bald cypress trees in Currituck County's North River floodplain has a new lease on life thanks to a joint effort between The Nature Conservancy and the N.C. Wildlife Resources Commission.

The Nature Conservancy purchased 1,421 acres of swamp forest in February, including about 90 acres of virgin bald cypress. The Conservancy will transfer the land to the Wildlife Commission through the Natural Heritage Trust adding the property to the North River Game Land. The transfer will boost the existing game land to 10,151 acres.

"It is a humbling experience to paddle among trees that were probably growing when Columbus discovered the Americas," said J. Merrill Lynch, assistant director of protection for The Nature Conservancy's N.C. chapter.

The North River wetlands complex is nationally significant as a large network of relatively pristine swamp forests and freshwater marshes encompassing over 30,000 acres. The largely roadless area is an important wildlife corridor for large mammals including black bears and bobcats. It also provides extensive habitat for migratory songbirds including prothonotary and Swainson's warblers. However, much of the area remains unprotected from logging.

The newly acquired tract is part of the Indiantown Creek Cypress Forest, a natural area harboring nearly 2,000 acres of relatively mature swamp forest, bottomland forest and the undisturbed bald cypress stand. The property borders the North River Game Land.

—Information courtesy of The Nature Conservancy

N.C. WILDLIFE RESOURCES COMMISSION

***Huge bald cypress trees** like these and other wetland species have been protected along the North River thanks to a joint effort between The Nature Conservancy and the N.C. Wildlife Resources Commission.*

Got a Gobbler?

Call 1-800-I-GOT-ONE to report your turkey harvest.

**All bearded birds harvested during the 1997 turkey season must be reported via the toll-free telephone reporting system.*

Catch Us at These Numbers

1-800-662-7137
to report violations of hunting and fishing laws.

1-800-628-3773
(NC VESSEL) for boat registration and titling.

1-800-675-0263 for hunting dates and shooting hours for migratory game birds.

1-888-248-6834 (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.

1-800-446-8663 (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through January 1997

Principal Balance
$23,548,241.36

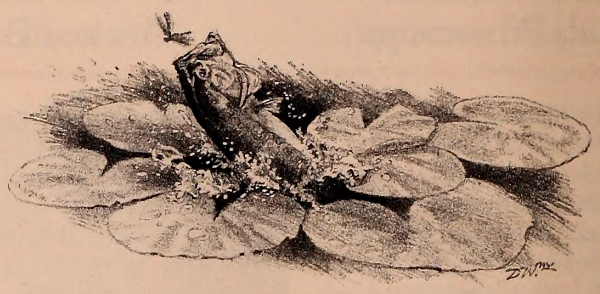
Interest Earned
$21,767,091.58

Total Receipts
$45,315,332.94

Interest Used
$10,049,660.04

Fund Balance
$35,265,672.90

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission, programs, the principal remains invested to generate additional interest for the future.



Fishy Business

by Rodney Foushee

With water temperatures on the rise, April is a fine time to work on improving fish production in farm ponds so there will be plenty of lunkers available in the coming months.

Fertilizing: As with land-based crops, the fertility of pond water determines its productivity. While many of our rivers and streams contain excess nutrients, isolated farm ponds can benefit from the addition of fertilizer. Pond fertilizer stimulates the growth of microscopic plants and animals that are eaten by insects and small fish, producing a larger food supply for game fish. A healthy plankton bloom can also block out sunlight, preventing bottom weeds. April is the perfect time to add fertilizer once water temperatures reach 60 F. Fertilization can generally help if bottom weeds are not well-established and you can clearly see 18 inches underwater. But excess fertilizer should be avoided since it can cause noxious algae blooms that die off and rob oxygen during the summer months.

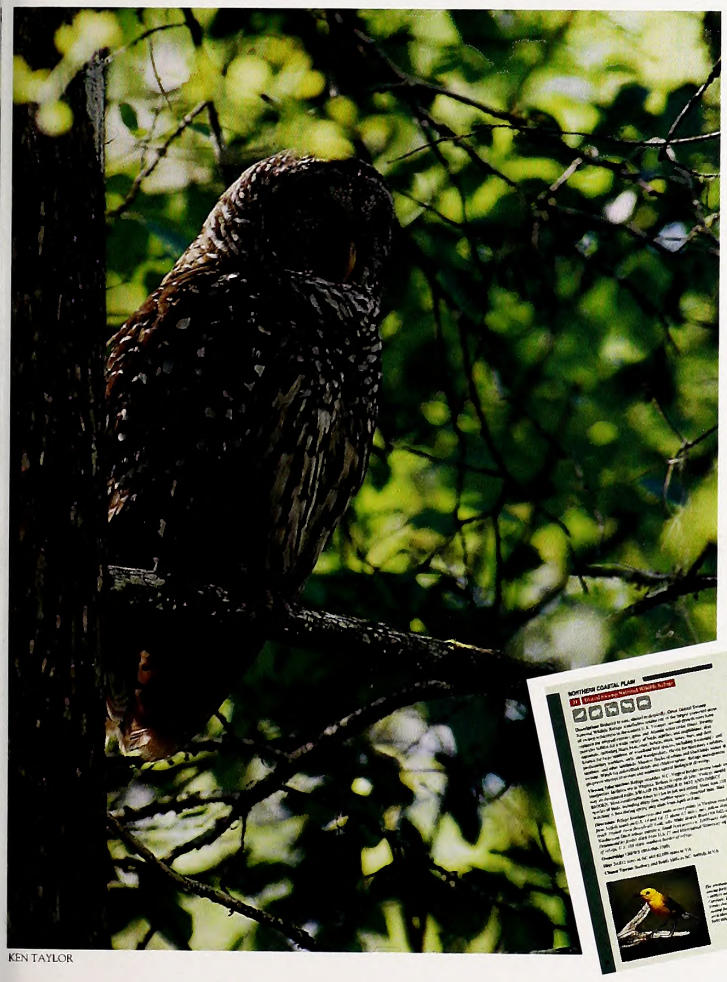
Supplemental Feeding: In some cases, supplemental feeding can be substituted for fertilizer to boost fish production in farm ponds. Once water temperatures reach 65 F, a high-quality floating feed can be given a few times a week. (Bluegills and catfish will more readily accept feed than bass.) Like fertilizing, care should be taken not to overfeed as uneaten pellets can rob oxygen and cause fish kills. To avoid problems, feed only the amount the fish will eat in 15 minutes and no more than 10 pounds per acre per day.

Weed Eaters: If bottom weeds are a problem, stock some plant-munching triploid grass carp into your pond. These sterile vegetarians can effectively control hydrilla and other aquatic weeds for up to 10 years. Stock at least 8 inch-long carp at 10 to 15 fish per acre to ensure their survival from predators. A permit from the Wildlife Commission is required to stock ponds with more than 150 carp or ponds of more than 10 acres. Only sterile grass carp may be used in North Carolina.

For more information on pond management, call the Wildlife Commission's Division of Boating and Inland Fisheries at (919) 733-3633. Your local district fisheries biologist as well as Cooperative Extension Service agent can also provide technical assistance.

Wildlife Commission Spotlight

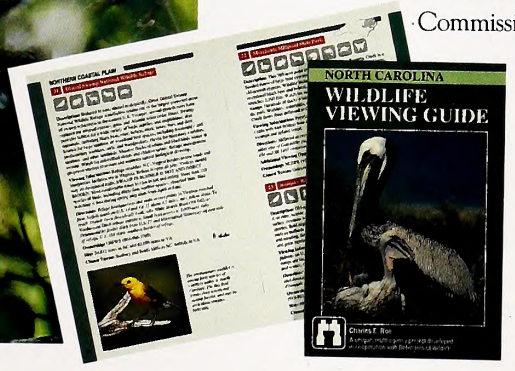
Nongame and Endangered Species: Watchable Wildlife



KEN TAYLOR

Watching Made Easy. Increasing public interest in viewing and photographing wildlife has challenged wildlife agencies to develop and finance new programs for this purpose. One national initiative called Watchable Wildlife provides opportunities for people to experience wildlife first hand. Federal and state wildlife agencies in North Carolina, in partnership with conservation groups and private corporations, developed the *North Carolina Wildlife Viewing Guide* (available in the "N.C. WILD Store" catalog) to identify selected wildlife viewing areas in the state. Many sites have been enhanced to increase viewer enjoyment, and distinctive highway markers (see above) are being erected to identify these sites.

KEN TAYLOR

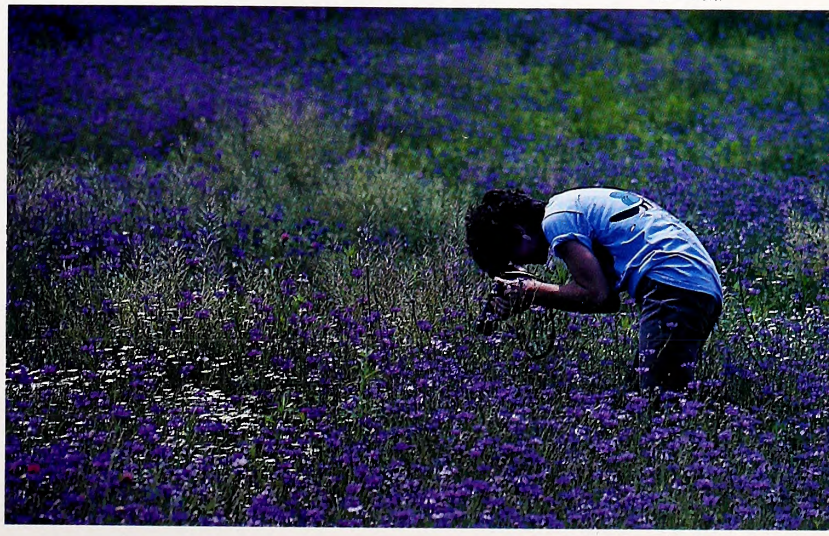


Watchable Wildlife. The N. C. Wildlife Resources Commission sponsors the Watchable Wildlife Program to increase public awareness of and support for wildlife. As the wildlife authority in our state, the Commission restores, manages, conserves, researches, regulates and protects our wildlife resources. Financial support for the program is provided through the state tax refund contributions to the North Carolina Nongame and Endangered Wildlife Fund.

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

Lend a Hand. Your tax-deductible donation to the Nongame and Endangered Wildlife Fund supports programs like the Watchable Wildlife Program. Make your contributions through the checkoff on the state income tax form, or give directly to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh N.C. 27604-1188.

KEN TAYLOR



Dressed to Impress

Don't tell Mother Nature that looks don't matter. When it comes to procreation, appearance can be critical, and that's why this gobbler is puffed up and strutting. If he wants a mate, he's got to make that all-important favorable first impression. And you thought only humans were shallow and superficial.

Periodicals postage paid at
Hickory, North Carolina

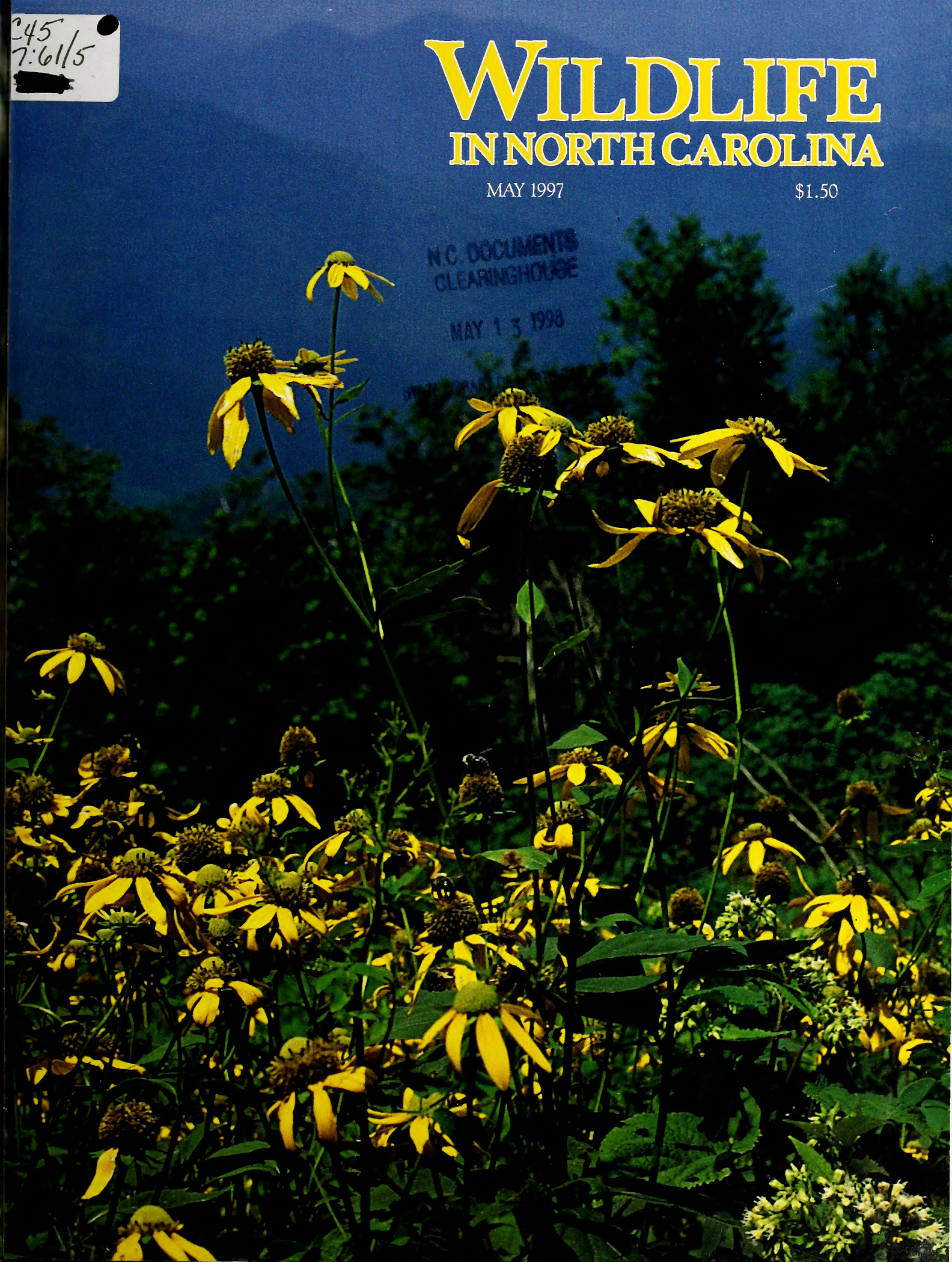
LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:61/5

WILDLIFE IN NORTH CAROLINA

MAY 1997 $1.50

N.C. DOCUMENTS CLEARINGHOUSE
MAY 13 1998

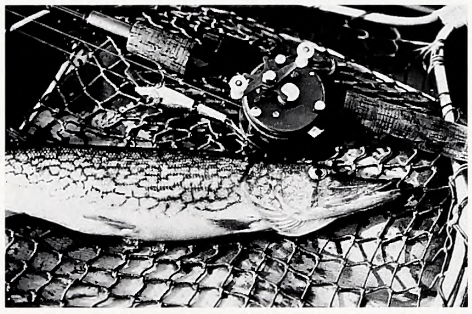


The Fish from Hades

by Jim Dean

After I began managing our family farm a dozen years ago—and got over the silly notion of turning a profit—I began to pursue more practical goals. One was the installation of a Conservation Reserve Program that has helped small-game wildlife. Another was the conversion of an old tenant shack into an oil-lamp, wood-stove retreat. More challenging, however, has been the construction and stocking of a 2½-acre pond.

The pond was built ostensibly for crop irrigation in 1986 and, because it crossed my mind that I might also fish in it on occasion, I instructed the bulldozer operator to leave lots of standing timber in the upper half of the pond. Later, I brought lilypads from Lake Mattamuskeet and planted cypress here and there, noting with satisfaction that these modifications yielded a near perfect replica of the blackwater coastal waters I'd fished as a child.



JIM DEAN

The initial stocking was to have been limited to bluegills, shellcrackers (redear sunfish), largemouth bass and fathead minnows (for forage). Unfortunately, the company I paid to stock the pond included numerous undesirable species such as bullheads, crappies and a miserably inferior green sunfish hybrid. I considered draining the pond and starting over, but the bass seemed to be growing fat on all the stunted forage. Besides, it occurred to my fishing buddy Jack Avent and me that it might be fun to experiment by adding another predator to help eat up the runts.

I have always been fond of chain pickerel—also called jack, jackfish or "hoe handles." This native species is common to many waters along the Eastern Seaboard, and is especially numerous in the blackwater rivers, lakes and millponds of our Coastal Plain. Most fishermen don't like them, claiming they are too bony for pleasurable eating (no argument there), and that they don't fight fair when hooked. True, pickerel sometimes wait until they are are beside the boat before they erupt in violent leaps and surges, often breaking or biting through your line. Yet I can't help admiring any fish that leaves me breathing hard with words on my lips I wouldn't use in church.

Besides, pickerel are truly handsome with elongated bodies and flanks of greenish gold relieved by a chain-like pattern. They have sharp, duck-like snouts that open to reveal awesome teeth, and their eyes are sinister and cat-like. Their entirety suggests a predator superbly adapted to ambush, a piscatorial Cassius with "that lean and hungry look." The metaphor that comes to mind is of a switchblade knife—beautiful, latent, lethal.

So, about seven winters ago, my fishing buddy Jack Avent and I rigged an aerated tank in his old truck and went pickereling in several Franklin County streams. We caught only six smallish pickerel, but put them in my pond anyway.

"Odds are that we've got both males and females," Jack said. "But who knows whether they'll find one another, like one another, or be able to reproduce even if they do?"

Over the next few years, we occasionally caught one of those originally stocked pickerel, and we were pleased to see that they had survived and were growing. Then, two years ago, I caught a pickerel that I was almost certain looked smaller than any we had stocked. But I couldn't be certain. This spring, Jack and I fished the pond one unseasonably warm afternoon and found the bass stacked up and sunning in the shallows on windy banks. We caught half a dozen on spinnerbaits, including a 4 pounder and a fat 6 pounder. But it was four diminutive jackfish—proof that pickerel procreation had prospered—that truly set our hearts aflame.

Though it was admittedly late to be seeking the advice of experts, I asked Fred Harris, chief of the Wildlife Resources Commission's Division of Inland Fisheries whether I done wrong to stock pickerel.

"Well, pickerel spawn on vegetation and fallen timber so you've apparently got the right habitat for them," Fred told me. "Certainly, bass and other predators such as pickerel should help control overpopulated prey species like bluegills, even prey species undesirable for ponds. Yet, by combining bass and pickerel, you may not see any greater impact on those prey species than if you simply had a good population of bass. Also, you run some risk that pickerel may prosper at the expense of the bass, or vice-versa, although theoretically that shouldn't be too big a problem since bass and pickerel occupy different niches even in the same water. I doubt that you've hurt your bass population to any great extent. If your bass can't prosper sharing company with pickerel, they probably wouldn't do all that much better without them.

"I don't know of any studies involving pickerel in ponds," said Fred. "When those young pickerel you're catching grow up and spawn, it will be interesting to see what impact they really have."

May 1997
Volume 61, Number 5

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

CONTENTS

4 High, Wide and Handsome
written and photographed by Harry Ellis ©1997
Our mountain balds hold many lovely surprises for those who stoop to look.

10 Tiny Soft Plastics for Bass
written and photographed by Gerald A. Almy ©1997
When bass refuse to strike, switch to these squiggly little fellows. They'll often catch bass—even whoppers—when bigger versions fail.

14 Sheer Delights *photographed by Ken Taylor*
Those who find pleasure in a sloping deadrise or sweeping sheer can contemplate the perfect blend between boats and wood at the annual wooden boat show in Beaufort.

20 Planet Jar *written by Ted Dossett*
photographed by Melissa McGaw
Totally enclosed with its myriad tiny living creatures sustained by sunlight, a microcosm is a wondrous introduction to ecology. Make one and be the first kid on your block to rule your own world.

24 Idiot's Guide to Camping *written by Eddie Nickens* ©1997
illustrated by Jackie Pittman ©1997
Worried that your first camping trip is doomed to disaster? Follow the advice of the Amazing Camperman and it will be a piece of cake. Trust me.

DEPARTMENTS

Our Natural Heritage *by Jim Dean*

Nature's Ways *by Lawrence S. Earley*

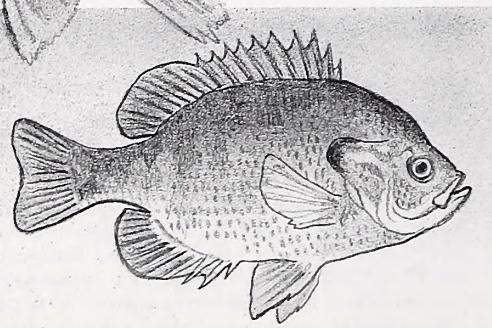
Back of the Book *by Rodney Foushee*

Wildlife Through the Year *by Rodney Foushee*

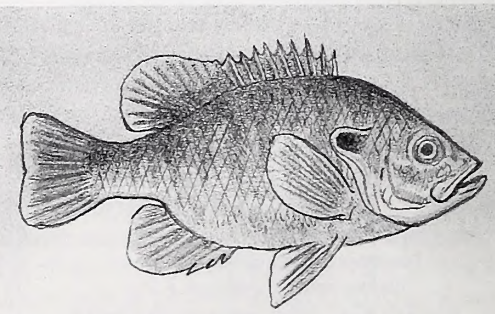
Cover *Yellow coneflowers grow in profusion atop Roan Mountain. Photographed by Harry Ellis.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and additional offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, P.O. Box 29607, Raleigh, N.C. 27626-0607. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

Green sunfish fin *slowly in the shallow, vegetated portions of a pond. A pond or creek habitat offers innumerable niches that fish and other creatures have learned to exploit. By doing this, many different fish—including several sunfish species—can live in the same habitat without competing for the same resources.*



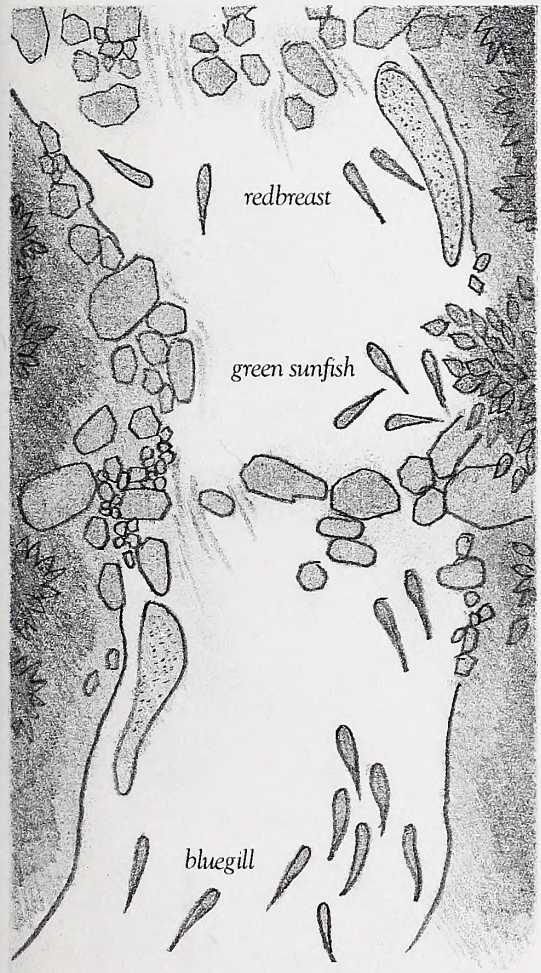
With its short, *compressed body, the bluegill can turn quickly in open water habitats to hunt the large insects that are its main food. Its small mouth is adapted to sucking in small prey.*



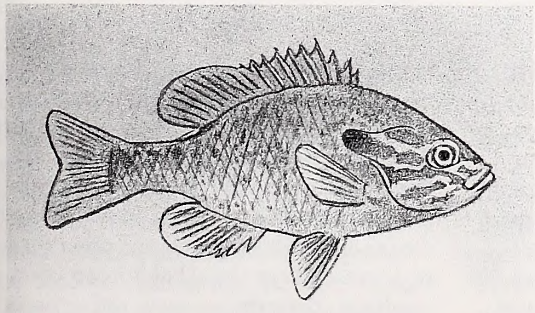
With a larger mouth *and body than the bluegill, the green sunfish can take larger food items as it forages among aquatic vegetation in sluggish water.*

Knowing Your Place

written by Lawrence S. Earley/illustrated by David Williams



Competition forces *sunfish into different niches in the creek habitat—fast current (redbreast), slow current (green sunfish), and pools (bluegill).*



The redbreast is more *at home in faster water than either the green sunfish or the bluegill.*

Unlike the picture of peace and amity often suggested by even the best children's books and films, animals live lives of constant struggle. Predators abound and disease can quickly decimate the weak. And on the population level, fierce competition between species for the best resources in a habitat is a powerful force to be reckoned with.

Freshwater sunfish species offer some instructive examples of how competition shapes a fish community. Consider the way the redbreast, the bluegill and the green sunfish, all members of the genus *Lepomis*, divide up their creek habitat. All three can be found often within close proximity, yet they behave as if there were strict partitions between them. The key is relative water velocity. Bluegills prefer water as nearly still as possible, while redbreast sunfish confine themselves to areas where the water velocity is stronger. The green sunfish is an intermediate type, inhabiting the extreme edges of the creek where it can find more sluggish water.

What this shows is that a creek is not a single, uniform habitat. With pockets of swift and shallow water, pockets of slow and deep water, areas with vegetation and areas without it, a creek offers innumerable niches for fish. By exploiting these separate niches, all three of these sunfish can coexist in essentially the same place at the same time.

But what it also demonstrates is the power of competition in shaping the community. To understand this, think of what might happen if some of these species were removed from their habitat and others were left behind.

In one classic study of a pond community, three pond sunfish—the green sunfish, bluegill and pumpkinseed—were introduced into separate ponds. By themselves, each liked the same location, the stems and leaves of vegetation that grew in the shallowest portions of the pond. But when all three species were placed in the pond together, the green sunfish alone was able to exploit the stems and leaves in the shallow, vegetated portions of the pond, but the bluegill and the pumpkinseed were forced to move to the deeper water. Here competition forced them farther apart, the bluegill feeding in the open water and the pumpkinseed sifting bottom sediments.

In some cases there is a great deal of habitat overlap without the competition you'd expect. Bluegills and largemouth bass, for example, are the dominant species in most farm ponds, found at all depths and monopolizing most of the food. How do they avoid competing with each other?

The answer is that their different body shapes and especially their different-sized mouths enable them to exploit different parts of the food spectrum. The bluegill's small mouth is adept at sucking in small prey. The largemouth bass's enormous mouth is perfect for swallowing fish whole. With its short, compressed body the bluegill can make the sharp turns and dextrous movements necessary to hunt its food. The bass's fusiform shape, on the other hand, adapts it to chase its fish prey.

Thus any aquatic habitat—creek or pond—should be looked at as offering a range of resources that fish species compete for. Competition forces them to divide their habitat spatially, by nudging them into separate locations. Competition forces them to divide it temporally when they use the same habitat at different times or seasons. It pushes them into waters of slightly different temperatures. Competition also forces species to exploit foods of different sizes.

The picture that emerges is one of fishes' relentless jockeying for position in their communities as they search for ways to exploit a limited resource.

High, Wide and Handsome

Our mountain balds hold many lovely surprises for those who stoop to look.

written and photographed by Harry Ellis ©1997

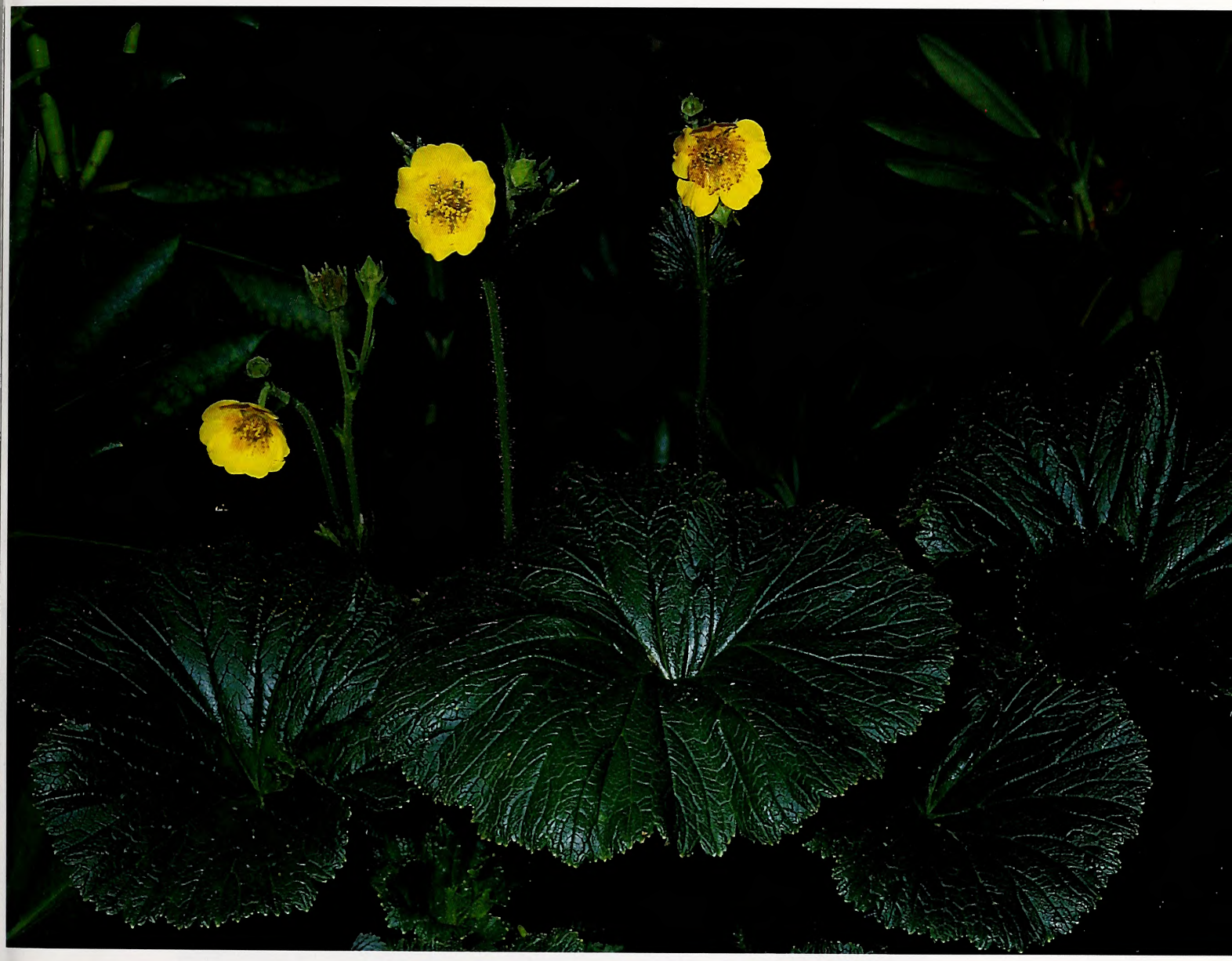
Mountain balds *include two types—grass balds and heath balds. Both are treeless, but they hold very different plant communities. Heath balds, also known as "laurel slicks," contain large numbers of flame azalea and Catawba rhododendron.*

Whether considered from the viewpoint of the professional botanist, the passing tourist or the passionate lover of nature with a yearning for sun-filled days in the open, the treeless areas scattered throughout the high southern Appalachians and known as mountain balds are among the most interesting spots in the world. The term "bald," however, is relative, for although trees do not generally grow there, plants of many other kinds form dense carpets over these areas, much to the delight of ecologists and botanists, who find here a veritable botanical treasure chest. Though the Ice Age glaciers never reached these mountains, they came close enough to bring to us a legacy of northern plants and flowers that eventually mixed with the southern forms already here.

For more than two centuries, botanists and plant collectors have been drawn to these mountains because of their rich floral variety and abundance. William Bartram came first—around the mid-1770s—seeking flowering plants for his father's famous Pennsylvania garden. Soon thereafter came the notable French botanist and plant collector André Michaux, who was followed by a long line of eminent men of science that included Fraser, Gray, Sargent, Nuttall, Curtiss, and Small.

Although there are many theories to explain the cause of mountain balds, no one knows with any degree of certainty how they came into being. Their origin remains an ecological riddle and a matter of scientific debate. We do know that when the first settlers arrived in our mountains, the balds were already here. Their age is to be measured in centuries. In earlier times, the grazing of sheep, cattle and other domestic livestock kept these balds in an open condition. But more recently, with government acquisition of the land and the cessation of all grazing, we are witnessing an invasion of trees and shrubs from the adjacent woodlands. The balds are slowly being swallowed up. If this process continues, most of our mountain balds could disappear within a century.

Two major types of balds occur in the



An endangered *species, the Appalachian avens* (Geum radiatum) *hugs a few high mountain summits in western North Carolina and eastern Tennessee. The origins of mountain balds are obscure, the subject of much scientific research. Grazing animals kept the vegetation short until recently.*

southern Appalachians—grass balds and heath balds. Grass balds appear as high mountain meadowlands with little or no tree growth. On these balds, the dominant plant species is almost always mountain oat grass (*Danthonia compressa*), which covers the ground in dense, luxuriant stands that the wind rolls into billows like the waves of an ocean surf. On some grass balds, sedges play a significant ecological role. In summer, these grasslands become inviting natural gardens where visitors stroll knee deep in golden carpets of hawkweed, buttercups and golden ragwort, with the hum of wild bees working in the blossoms. These balds are lush and green in summer, and in autumn they take on a hue of burnished gold.

Heath balds are also treeless areas at high elevations, but they support a different community of plants. They are made up almost entirely of plants belonging to the heath family—Catawba rhododendron, flame azalea, sand myrtle and others. These are all tough, hardy species that thrive well in the harsh, wind-blasted environment of these high elevations. When viewed from afar, heath balds appear as smooth (or slick) green carpets and are locally called "laurel slicks." Close at hand, they form incredibly thick tangles of wildly twisted branches and stems that earned them the name of laurel or rhododendron "hells" from the early settlers, who found that travel through them was next to impossible. But there comes

***Heart-leaved** aster (Aster chlorolepis) is one of many aster species that flower in the autumn on the grass balds. The open mountain balds are threatened today by an invasion of trees and shrubs, chiefly the Canadian blackberry, that are swallowing up the open spaces and choking the native wildflowers.*

a time each year, usually in June, when these slicks become sites of spectacular beauty, as whole mountaintops are set ablaze by the blooming shrubs.

Throughout the southern Appalachians there are more than 200 mountain balds, many of them in western North Carolina. In the Great Smokies there are Andrews Bald, Gregory Bald, Silers Bald, and many more. Other western North Carolina balds include Wayah Bald in the Nantahalas, known for its beautiful stands of flame azalea, Big Pisgah Bald, Yellow Mountain Bald, Craggy Gardens on the Blue Ridge Parkway and the Roan Mountain balds—a chain of grass and heath balds stretching in an east-west direction for a distance of some 12 miles. In addition to its heath and grass balds, Roan Mountain has an alder bald with vigorous clumps and masses of low-growing mountain alder (*Alnus crispa*), a rare species over most of the southern Appalachians.

More than 300 species of flowering plants have been found on grass balds. The dainty little bluet (*Houstonia serpyllifolia*) is to be expected on almost every grass bald, where it blankets grasslands over wide expanses with its pale blue or violet flowers. The three-toothed cinquefoil (*Potentilla tridentata*) covers grass balds from Greenland to Georgia with spreading carpets of white flowers that look like new-fallen snow at a distance. In late summer, the basal leaves of this plant turn a deep red color. As a result, the plant is sometimes called "wine-leaf" cinquefoil.

Throughout the blooming season, these windswept grasslands are quilted with the color of many kinds of wildflowers, such as the tassel rue, turkey beard, blazing star, mountain Saint-John's-wort and fire pink. Two species of orchids are abundant on most of these balds: the purple-fringed orchid (*Platanthera psycodes*) and the ladies' tresses orchid (*Spiranthes cernua*), which grows on elevations up to 6,000 feet or more. During late summer and early autumn, several species of aster bloom, along with many kinds of goldenrod, like the mountain goldenrod (*Solidago glomerata*) and Roan goldenrod (*Solidago roanensis*). There is also Canada goldenrod (*Solidago canadensis*)

The minnie bush (Menzesia pilosa), *with its azalea-like leaves and blueberry-like flower, is a constant presence in the heath balds.*

and the rare and endangered Blue Ridge goldenrod (*Solidago spithamaea*).

Many flowers of exceptional beauty bloom in these lofty meadowlands, like the yellow coneflower, scarlet bee balm, Turk's cap lily and the lovely Gray's lily. As sightseers walk on these summits among the flowers, they often see below them and on every side magnificent views of farmlands, wooded valleys and hills, with range upon range of purple mountains receding into the distance. Surely no wildflowers ever had a finer setting in which to display their beauty.

The Gray's lily (*Lilium grayi*) grows in the high mountains of North Carolina, Tennessee and Virginia, chiefly in the open grasslands. It was discovered by Asa Gray on Roan Mountain in 1840, and the major population of this flower is still on the Roan today. It is locally abundant on some of the Roan balds, but the current major threat to its continued survival is the encroachment of shrubs and other plants into its habitat—chiefly the thornless Canadian blackberry (*Rubus canadensis*). Some areas of the balds are growing up in dense thickets of blackberry briers, which choke out the lilies. The U.S. Forest Service has tried various measures to prevent the loss of this critical habitat, with little permanent success. They have tried fire, chemicals and a large herd of goats as a three-year test program, which has now ended, at least for the present. The whole program is under study.

Also growing on many of these areas is the poisonous white snakeroot (*Eupatorium rugosum*), sometimes in dense masses, with white flower clusters. Fatal cases of "milk sickness" in humans have been traced to the use of milk and butter from cows that had eaten it. In Mitchell County, where I live, the poison caused deaths in the early years. One of the Roan Mountain balds—Jane's Bald—was named for a woman who died of it in a cabin on the side of the mountain. Today the poisoning of humans by white snakeroot is almost nonexistent.

Natural heath balds, like grass balds, support little or no tree growth, but unlike grass balds, they comprise chiefly of plants belonging to the heath family. On most of

The spectacular *Turk's cap lily* (Lilium superbum) *is one of hundreds of wildflower species that bloom in the windswept grass balds, transforming them into spectacular natural gardens.*

Among the blooming *flowers dotting the grass balds is the mountain Saint Johns-wort* (Hypericum graveolems).

these heath balds, the Catawba rhododendron (*Rhododendron catawbiense*) is the dominant shrub, although on a few it is the flame azalea (*Rhododendron calendulaceum*).

Anyone who visits a heath bald when the rhododendron is in full bloom will find himself in the midst of one of the finest scenes of natural beauty to be found anywhere on earth. Perhaps the best display of blooming rhododendron in the entire southern Appalachians is on Roan Mountain, 12 miles north of Bakersville, a part of the Pisgah National Forest. Visitors by the thousands come each year to the "Rhododendron Gardens"—one of Roan's heath balds—where more than 600 acres of Catawba rhododendron glow with color. Peak color is to be expected around June 20. Here viewers stroll on constructed trails and walkways between walls of pink and rose-purple blossoms that are almost stunning to the senses. There are hundreds of acres of rhododendron that also bloom each year in spectacular exhibits on Andrews Bald, Gregory Bald and Mount LeConte in the Smokies, and at Craggy Gardens on the Blue Ridge Parkway. Other sites could be mentioned as well.

Flame azalea holds a distinctive place among the heath bald shrubs. Its blossoms are seen in every possible color tone from bright lemon yellow to brilliant flame red. On some rocky heath balds also blooms the pink shell azalea (*Rhododendron vaseyi*), a colorful North Carolina endemic species well adapted to the high elevations. Many of these heaths also include the mountain laurel (*Kalmia latifolia*) that often grows in almost impenetrable entanglements which in the spring come alive with delicate shades of pink as the flowers burst into bloom.

Other important shrubs of these balds include the sand myrtle (*Leiophyllum buxifolium*), an evergreen heath growing close to the rocks in cushion-like mats and bearing showy white flowers with red stamens. Also present are the blueberries (*Vaccinium* species) that are relished by wildlife and humans alike, the wintergreen, or teaberry (*Gaultheria procumbens*), with white urn-shaped blossoms, and the minnie bush (*Menzesia pilosa*), with a leaf like an azalea

***Sand myrtle is one** of the heath family members (others are Catawba rhododendron and flame azalea) that knit together the tightly vegetated heath balds. So impassable were the thick tangles of heath vegetation on these balds that early settlers nicknamed them laurel "hells."*

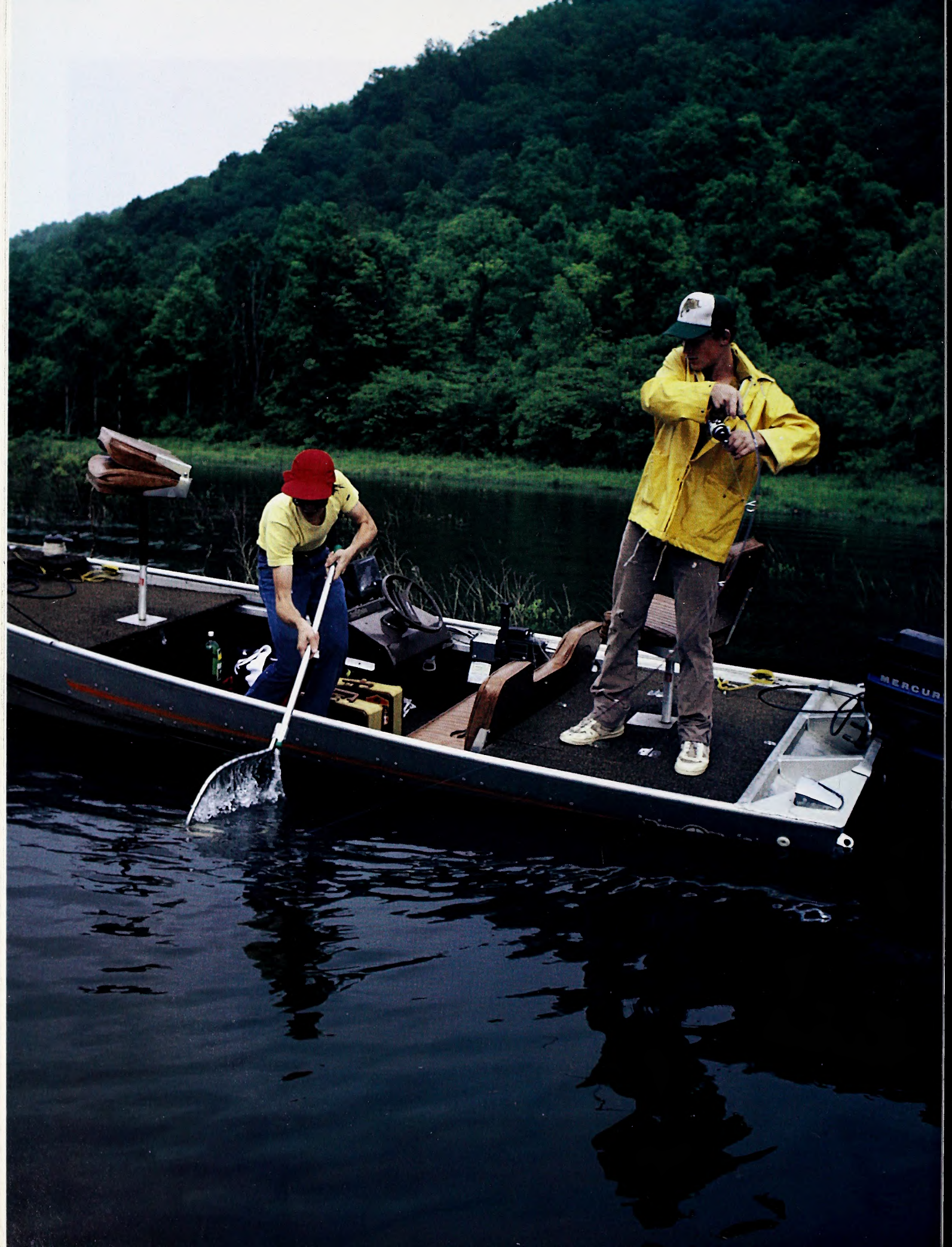
and a flower like a blueberry.

Both grass and heath balds harbor many species of rare, endemic and endangered plants. One such plant is the Appalachian avens (*Geum radiatum*), with crinkly, geranium-like basal leaves and bright yellow, buttercup-like flowers. An endangered species, it is found on a few high mountain summits of North Carolina and Tennessee. Most of the locations where it is found are under heavy recreational use by the public, and its future is uncertain.

The Blue Ridge goldenrod (*Solidago spithamaea*) lives on a few rocky balds of North Carolina and Tennessee, where it is severely threatened with trampling by sightseers, hikers and climbers.

Mountain golden heather (*Hudsonia montana*), a North Carolina endemic species, grows on a few rocky balds and exposed cliffs, chiefly in Burke County. Its preference for rocks and rock ledges makes it vulnerable to disturbance and uprooting. Hikers and climbers have destroyed several populations of this plant in the last 20 years, like the one on Table Rock Mountain. Because it probably occupies the most critical habitat of any of our plants, its future appears rather bleak. Like some others among our plants, it has been pushed to the brink.

If we should lose any of these rare plants and flowers, we could never recover them. Whether future generations ever see these wild and beautiful things lies solely in our hands. ⊠


MERCUR

Tiny Soft Plastics for Bass

When bass refuse to strike, switch to these squiggly little fellows. They'll often catch bass—even whoppers—when bigger versions fail.

written and photographed by Gerald A. Almy ©1997

The strawberry-scented plastic worm landed with a plop where the rocky point tapered sharply into dark green offshore water. Curtis Hodnett was a picture of concentration as he studied his line where it entered the lake. Like a heron stalking baitfish, he leaned forward slightly, then suddenly reared back on his graphite rod, reeling simultaneously.

The unseen quarry bucked hard in resistance, then stripped line in staccato bursts before giving in to the relentless pressure of the rod. Reaching down, Hodnett grabbed the 3-pound largemouth bass by the lower lip, twisted the hook free and gently released the fish.

If you were asked to speculate on the kind of outfit Curtis used to catch that bass—and about 12 others that morning—what would you guess? Most experienced anglers would suggest a stout baitcast rod, 20-pound line, a 4/0 hook and a 7- or 8-inch worm. Typical bassing tackle. They'd be wrong. On that trip over 20 years ago, Curtis was using a light spinning rod, 6-pound line, a 1/0 hook and a 4-inch soft plastic Mann's worm. Such tackle was revolutionary back then. In the early 1970s, most bassers used tackle heavy enough to "cross the eyes" of every largemouth that pecked at their lure. But the day I spent with Hodnett was an eye opener for me. Since then, bass have been subjected to even greater fishing pressure, and the lesson I learned from him has become even more important. In short, Curtis showed me that using lighter tackle and a variety of scaled-down, soft-plastic lures can often be more effective than the heavy rods, thick line and snake-sized worms normally associated with bass fishing.

***You're likely to** bring fewer bass to net if you insist on fishing large lures. The simple fact is that small lures—especially worms, salamanders, grubs and similar soft plastics—will often catch bass when nothing else works.*

***They're nothing** fancy, but small soft plastic lures like these are available in a wide variety of shapes and colors. One thing they have in common is that they catch lots of bass.*

The use of miniature soft-plastic baits on light tackle for bass has become even more important in the 1990s as fishing pressure has intensified on lakes and rivers. Bass have become more discriminating than ever. Light tackle is especially effective on clear mountain lakes that hold both largemouths and smallmouths. But the approach also works on farm ponds, tannin-stained tidewater lakes and the big impoundments of the Piedmont such as Norman, High Rock, Harris, Jordan, Falls, Kerr and Gaston. It would be tough to find a place it didn't work.

In fact, it was on 20,300-acre Gaston Lake where Hodnett first learned the effectiveness of presenting small plastics with light tackle.

"I picked up this strategy of using small plastic worms when I was fishing Lake Gaston with another fellow," Curtis said. "I was using the customary heavy bass tackle for the time. My buddy used 6-pound line and small worms, and he really wiped my eye. I think I caught two bass that day while he got over 20. Since that time, I've been refining my tackle and employing smaller worms. My fishing has really improved."

Delivering tiny soft plastics on light tackle isn't just a skittish-bass, clear-water proposition. The technique works anywhere bass are found, and at any time of year. I've found small soft plastics particularly good during the early spring when the water is still cool and the fish are sluggish. They're also excellent during the heart of summer and into fall. On rivers, miniature plastics are especially deadly in both the rocky smallmouth flowages of the west and the tidewater rivers of eastern North Carolina.

But there has been one major change since the 1970s. Today's angler has far more variety in small soft-plastic lures. Now, major plastics manufacturers are coming out with a wide variety of soft-plastic baits. Just recently Riverside, for example, introduced its Gotta Bite Micro Air Series. Included are a Micro Air Lizard, Claw (crayfish), Fly and Grub. Like many of the miniature plastics offered by companies such as Berkley, Mann's, Kalin, Zeta Bait, Johnson, Culprit, Zoom, Mister Twister, Gene Larew, and Bass Assassin, they are manufactured with scent and flavor enhancers or impregnated with salt to help fish key in on them and hold on longer once they bite.

The emergence and success of a wide variety of small plastics have even caught the attention of bass pros. Pros hate to lose a single fish because of light line when it can cost them money in a high-dollar tournament. Yet, many of today's pros carry as many spinning rods as baitcast outfits, and they throw lots of small soft-plastic lures. The reason? They realize that sometimes scaling down is the only way to fool bass, even if it

means losing an occasional fish.

Certainly there are times when miniature plastics are inappropriate. If you're fishing thick vegetation or standing timber and blowdowns, it will be harder to land bass over 3 or 4 pounds. When the water is murky, it is also easier for a bass to see or sense a larger offering. Indeed, if bass are particularly aggressive and striking big baits, there's no need to scale down to miniature soft baits.

For the majority of fishing situations, however, I've found you can dramatically increase your catch by using what many might scoff at as "panfish" tackle and lures. And when you stop to think that most of the bass we catch are 1 to 3 pounds, a 4-inch worm seems far more appropriate than a 7 or 8 incher. A lizard the size of your finger is more in order than one the size of your hand.

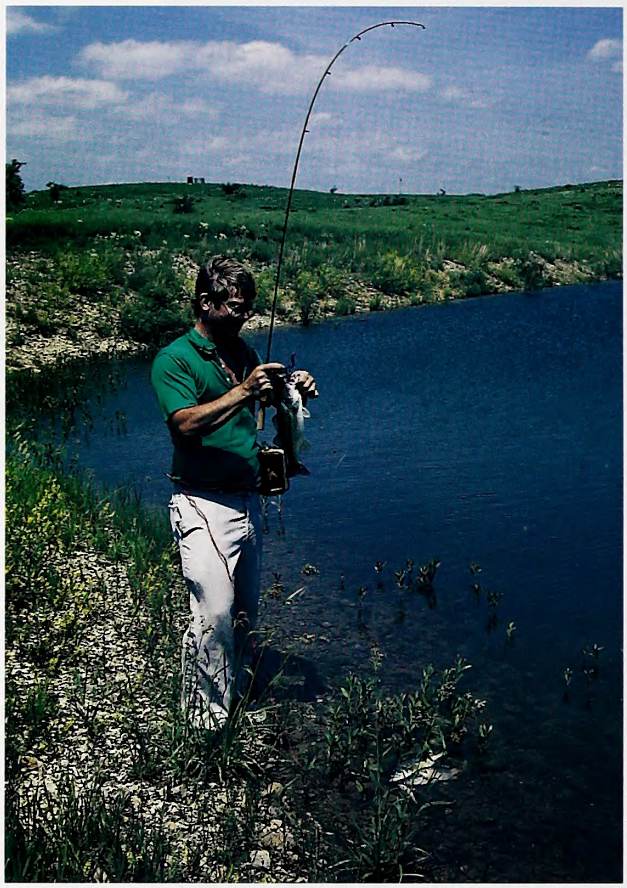
Fishing small soft-plastic lures is also less tiring over the course of a day. Catching fish is also more fun, because you have to use some skill in fighting the quarry instead of just cranking it in against a clamped-down drag and hoisting it aboard.

But before discussing the best miniature soft-plastic lures, let's take a look at tackle. The size line you choose will depend on the fishing situation. If large bass are present in a fair amount of cover, you may need to use 8-pound test. However, for most miniature worm, grub, lizard and crayfish angling, I find that 6-pound test is the best choice. It's light enough to allow long casts and sink fast, and its diameter is small enough not to spook fish. It's also tough enough to handle even large bass unless cover is especially thick. On super-clear mountain lakes and smallmouth rivers, however, I sometimes scale down to 4-pound test.

Can you really land large bass with such light lines? A friend of mine, Fred Kesting, used 4-pound test to land a 13-pound largemouth on a miniworm in Florida. Doubtless a bit of luck was involved, but it shows there's really no limit with this light line if you're careful.

Even some baitcast outfits will handle lines as light as 8-pound test with ease (even 6-pound if necessary), and I often use such tackle for fishing small soft plastics. Spinning gear, however, is usually a better choice, and I've found that open-faced reels work best.

Rods require careful consideration. For some bantamweight lures, wispy ultralight rods that flex most of their length can be employed. When fishing plastics, however, you'll want a 5½- to 7-foot rod with a stiffer



***The author likes** to walk around his pond testing various lures on the bass. One thing he's learned is that small soft-plastic lures frequently outfish other artificial lures.*

light, or even medium light, action. Because of the stretch in monofilament, you need a rod with some backbone to allow you to set the hook. You can still strike reasonably hard with light lines and a fairly stiff rod and not break off, because the drag will slip if set properly. A stiffer rod also allows you to "feel" the lure better as it crawls over rocks, logs and weeds and distinguish strikes.

You need to keep hooks sharp, so carry a file or electric sharpener for touch-ups, or simply retie with one of the new super-sharp hooks now available if the hook point becomes dull.

The Texas rig used by most anglers for big worms on heavy baitcast tackle can also be employed for 4-inch worms, small lizards and crayfish. I've found miniworms can produce any time of year, while lizards are particularly good just before and during the spawn. Small crayfish are top summer and fall baits. Instead of using the typical 3/0 hook for these tiny plastics, scale back to a 1/0 or size 1 hook. You can usually get by with a sliding bullet sinker of 1/16 to 1/8 ounce.

I think it also helps to run the hook point back and forth through the channel where the point is buried in the worm once or twice, so it will come out easily when you tighten up to set the hook. With this approach and the new needle-sharp hooks, it's easy to set the hooks firmly with a Texas-rigged mini-worm and 6-pound line. Simply take up slack and, when you feel the fish, reel fast and simultaneously pull back smoothly with the rod.

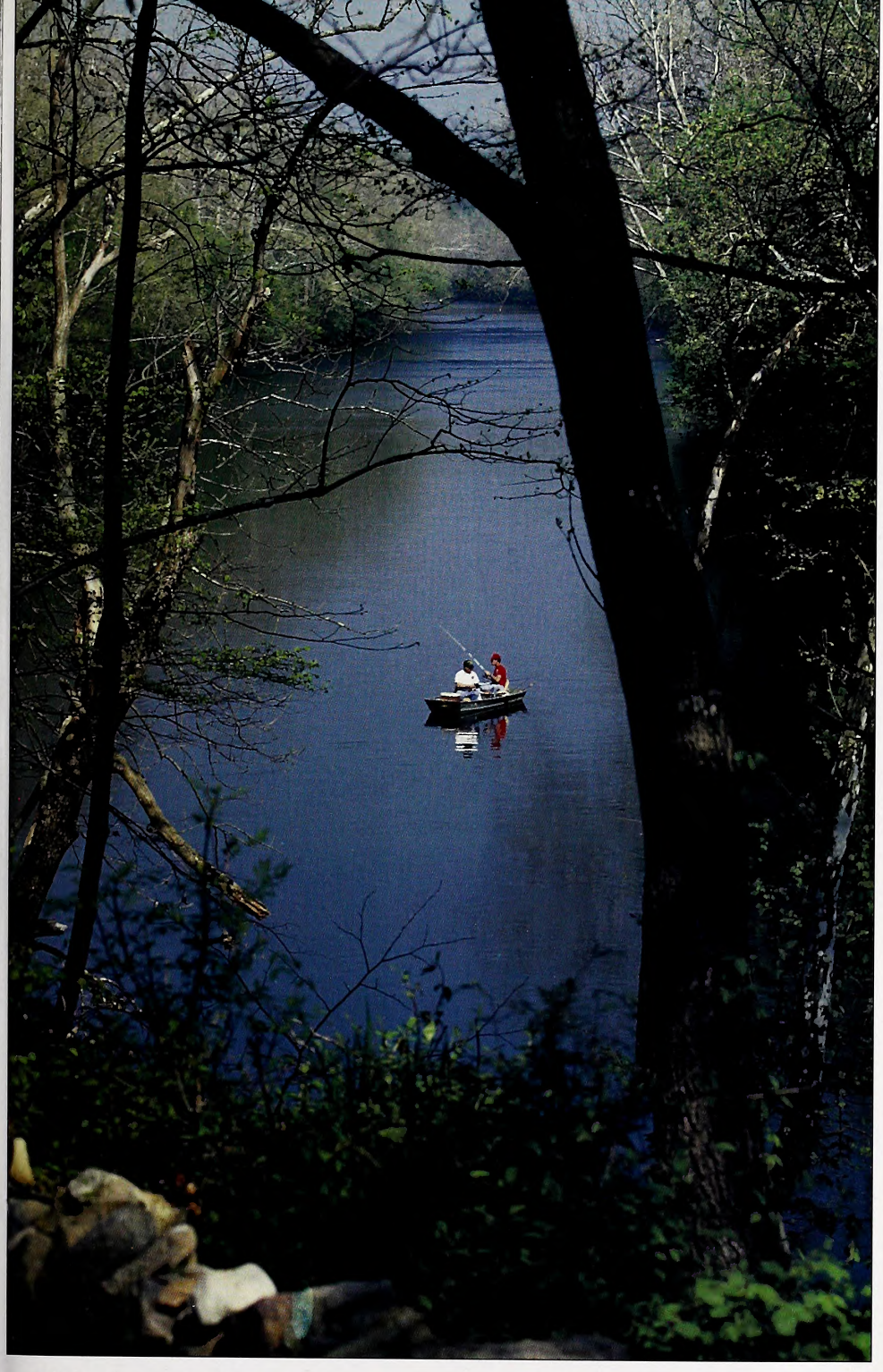
Another good rig is a jig with the plastic lure impaled behind the lead-head. This is the rig Kesting used to take his 13 pounder. I've had great luck with this setup on open-water lakes where few weeds or brushy snags are present. I use both round jigheads in the 1/16- to 1/4-ounce size and Charlie Brewer's slider jigheads for this type of fishing.

Another setup I like is the Carolina rig. I use a 1/4- to 1/2-ounce weight threaded on the main line, followed by a bead, a barrel swivel, then a 3- to 4-foot leader. Another good option is the new Mojo "slip-shot" sinker that is cylindrical and has a rubber stop that allows you to slide it up and down the line any distance from the lure and avoid using a swivel. My favorite is the 1/4-ounce size. Of course, you can use a Texas-rigged worm with the Carolina setup if snags are a problem, however, I generally prefer an exposed hook, using one with a weed guard if necessary.

Another good offering with the Carolina rig is one of the small, prerigged, double-hook worms such as those made by Mann's, Touchdown, Ike-Con and others. These have twin hooks rigged inside the body with just the points exposed, so you can simply tighten up and reel when you feel a fish touch the bait. The small hooks penetrate easily.

"Split shotting" is a tactic popular among West Coast anglers, and it's another variation of the Carolina method of fishing small soft-plastic baits. Instead of using a bead, swivel and sliding sinker, simply crimp one or two round split shot on the line 18 to 30 inches above the bait.

With all of these setups, two types of retrieves can be effective. The lift and drop is standard among worm fishermen and works well with miniature baits. But day in and day out, I've caught more fish simply reeling very slowly and steadily. This seems to mimic more realistically the subtle movements of baitfish and other aquatic creatures slinking through the depths. One exception would be with small crayfish, since these crustaceans move in a stop-and-go motion, and the lift-and-drop retrieve may work better.



***Streams and rivers** are ideal spots to fish diminutive soft-plastic lures. They more nearly match the size of prey found there, and they can be rigged to avoid snagging on rocks, limbs and other snags.*

With either retrieve, make sure you can feel the bait or sinker bumping rocks and logs and scraping over the bottom. If you hit brush, jiggle the worm gently while trying to keep it in the cover as long as possible.

Top spots to present these offerings include points, dropoffs, submerged islands, logjams, rock piles, ledges, flats, docks and the edges of weed beds. Color preference can vary from lake to lake and day to day, but some of my favorites include purple, black, red, brown, chartreuse, pumpkinseed and smoke.

Grubs are also highly effective. These are short, soft-plastic lures that look something like a plastic worm cut in half, but chunkier in the body. Some grubs have stubby double tails, while others have paddle tails, but most feature thin twister-type tails. They range in size from barely an inch to 6 inches or more, but for light-tackle bass fishing, the 1½- to 3-inch sizes are best. They're usually, but not always, fished threaded behind a leadhead jig. (Tube lures, a grub variation, have the whole leadhead except the hook inserted inside a hollow plastic body.)

Grubs are easy to cast with thin line and a lightweight rod, and their compact size lets them duplicate many small food forms. At mid depths, their subtle, slow swimming motion makes them look like baitfish. Hopped, crawled or scurried across the bottom, they simulate crayfish, leeches, nymphs and small catfish.

Grubs don't have dramatic action, but neither do most natural bass foods. Their subtlety is especially appealing to bass on hard-pressured waters, and on clear lakes and rivers. They are also particularly good after a cold front has pushed through and fish are off their feed.

Anglers once considered grubs as cold-weather lures, but now they are widely used all months of the year, and they may score even better in hot weather, when many young-of-the-year baitfish are present. Fish them in shallow water around points, boat docks, fallen logs, weed line edges, the mouths of feeder creeks and rock piles. In deeper water they'll work over dropoffs, ledges, bridge abutments, flooded timber and underwater springs.

Rig grubs on either round or flattened slider jigheads that weigh from 1/16 to 1/4 ounce. If snags are a problem, leadheads with weed guards can be used. Another option is to rig the grub Texas style on a size 1 or 1/0 hook.

One of the most unusual rigs I've ever employed uses a short-shanked size 4 to 8 bait hook such as those made by Gamakatsu or Mustad, threaded only 1/8 to 1/4 inch into the nose of the grub. Add one or two round split shot 18 to 36 inches up the line, or use a barrel swivel and sliding egg sinker for a traditional Carolina rig. This may seem like an odd way to hook the grub, but it works. The grub displays maximum action this way, and when a fish bites, all you have to do is maintain pressure and reel to set the hook.

Whatever rig you use—leadhead, Texas or Carolina—strikes while the lure is sinking are very common with grubs. Cast close to any targets you want to cover and watch the line carefully as the lure falls. If a pickup doesn't come on the fall, slowly crawl the grub back. A steady retrieve is best with slider and Carolina rigs. With round leadheads it occasionally pays to twitch or hop the lure gently from time to time. Pause occasionally with all of these rigs to let the lure settle near the bottom. Often fish will nail it then.

Don't overlook miniature plastics on light tackle. With the increasing pressure on bass, the combination of light tackle and small lures is often the ticket to faster action—and lots more fun. ⊠

Simmons Sea Skiff

Sheer Delights

Those who find pleasure in a sloping deadrise or sweeping sheer can contemplate the perfect blend between boats and wood at the annual wooden boat show in Beaufort.

photographed by Ken Taylor

Sharpie on a reach

Among those who love boats, there is a special appreciation for boats made of wood. It isn't that a hull made of fiberglass, aluminum, steel or even reinforced concrete can't have lovely lines. In many cases, boats made of such materials may be more durable. Yet, such materials lack the near sensual appeal and natural beauty of wood. The wooden boat show sponsored annually each spring by the North Carolina Maritime Museum celebrates the beauty and history of such watercraft. This year, the event will be held on Saturday, May 3 from 10 a.m. to 4 p.m. on the Beaufort waterfront.

In keeping with the natural affinity between boats and wood is an inherent appreciation for older designs—canoes, skiffs, sharpies, shadboats, schooners, prams and other timeless hulls built for pleasure or work. While many of the wooden boats displayed each spring at the wooden boat show in Beaufort are modern reconstructions lovingly researched and crafted, some boats are veterans that have survived many years afloat.

Boats on display

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

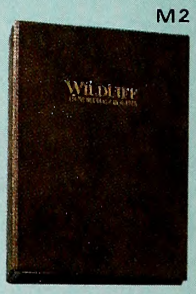
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

Wildlife in North Carolina Magazine

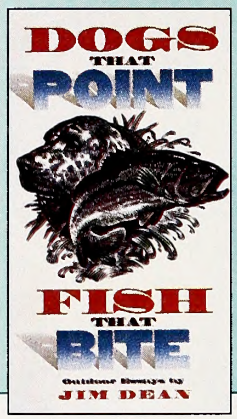
See our easy-order subscription form on back!

- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**

M2

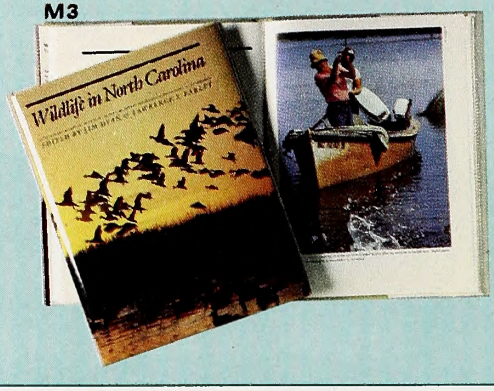


- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**



M8

M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

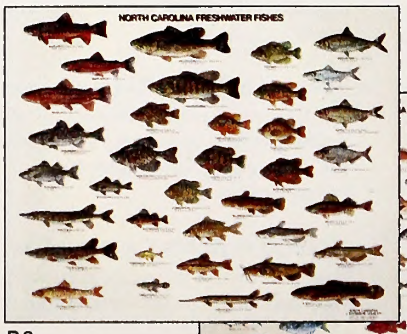
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

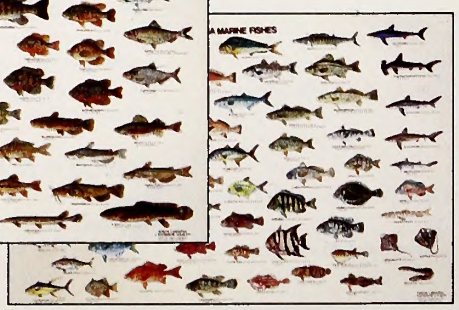
- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**



P6



P7

P3 P4 P5 P8

- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

MAGAZINE SUBSCRIPTIONS

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip _____ - _____

MAGAZINE GIFT SUBSCRIPTIONS

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

____ Magazine/gift subscriptions **TOTAL**

EDUCATIONAL MATERIALS

WS97

Name _____ Home phone (___ ___) ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____ - _____

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL**	$
Discount (subtract 15% discount for **retail** orders of $100 or more)	$
Sales tax *(N.C. residents add 6% sales tax)*	$
Educational materials **TOTAL**	$

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

- ☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
- ☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires____/ _____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

♻ *Printed on recycled paper*

N.C. Wildlife Endowment Fund

Round-stern sharpie

Handsome woodwork

Sailing prams in race

Visitors to the North Carolina Maritime Museum's wooden boat show can see displays of handsome watercraft, demonstrations, races and various other activities along the Beaufort waterfront. Be aware, however, that you will almost surely be struck with an irresistible urge to build your own wooden boat. There are only a few things you need to consider. How big is your living room? Are the doors big enough to accommodate the finished hull? How does your family feel about wood shavings and the smell of fresh varnish?

PLANET JAR

Totally enclosed with its myriad tiny living creatures sustained by sunlight, a microcosm is a wondrous introduction to ecology. Make one and be the first kid on your block to rule your own world.

written by Ted Dossett / photographed by Melissa McGaw

Over the years, visitors entering my office have reacted so predictably that I know exactly what to expect. Often, the scenario is reminiscent of that old comic routine in which Steve Martin looks straight into the camera and, with a facial contortion, accent, inflection and emphasis that change each time, repeatedly asks, "What the h... is that?" Many have been too polite to ask, but I could tell by their expressions that the same question was racing through their minds. So what, in fact, is this thing that causes such wonderment?

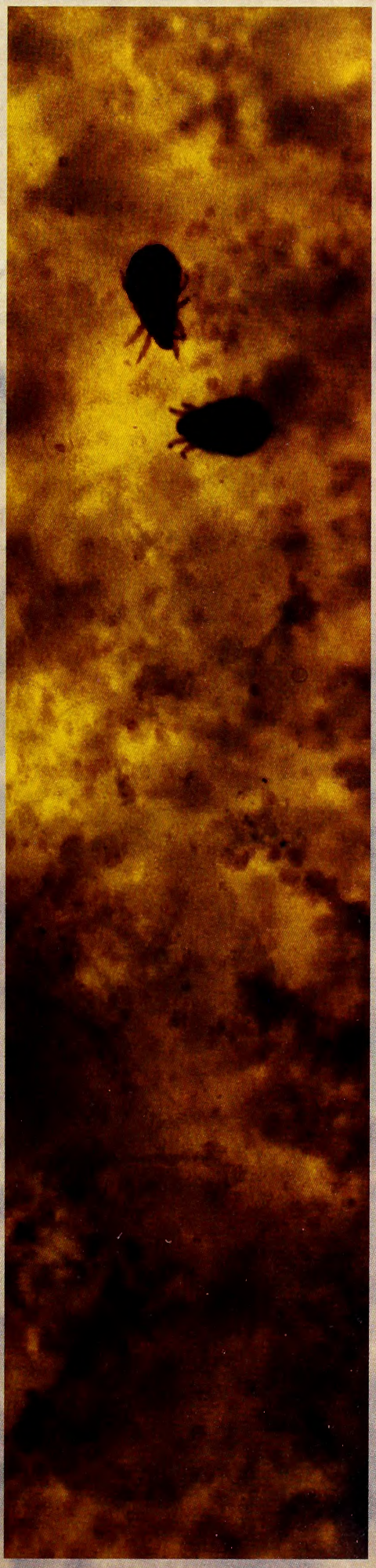
It's a microcosm, or a closed aquatic ecosystem, the most basic of science projects—a gallon jar full of pond water, mud, creatures barely visible and smaller, some twigs and leaves from the pond bottom, and the squeezin's from them called aufwuchs (that's a German term for organisms that are attached to or move along submerged surfaces or on the bottom; they're also called periphyton). Add some emergent vegetation such as pondweed and seal it all tightly in a gallon jar. To the uninitiated it all may appear disgusting, but in reality what you've created is a brave new world sealed and living indefinitely off its own oxygen.

For more than 23 years now my microcosm has sat on the sill of my office window, blithely chugging along, consuming, producing, consuming, producing, creating its own rhythms, blissfully oblivious to looks of revulsion and the fact that its natural eutrophication is reaching the limits of its growth—in this case the lid of the gallon jar.

Aside from learning how to pronounce aufwuchs, building a microcosm isn't that hard. But it is possible to make mistakes. My first one died when I sat it directly in the warm June sunlight and cooked the life out of it—no debate there about a global warming trend. It was just a minor oversight—even great creators commit them—but being wiser after broiling an entire ecosystem, I decided on a more temperate climate. I put the microcosm in the shade, where it has been thriving ever since. It even endured a truly cosmic threat when it survived a stint in my daughter's high school biology class.

For the first several years this tight little planet was the picture of health: tiny snails the size of a pinhead peacefully grazed their glass-walled pastures, the bright green pondweed seemed to be enjoying its cozy little niche, and every once in a while a minuscule creature of some sort would zoom by, then disappear into the dimness of the depths. Along the way a few of the visible species disappeared, and probably many more, because the most detailed look I could get was with a hand magnifying glass that focused only a few inches into this glass-walled universe. And that must have been a terrifying spectacle to the inhabitants, a huge blue-and-white sphere, distorted and shot with blood red rivulets, gazing down from on high. But overall, my microcosm seemed to have achieved a nice balance

Yet, in the best of worlds there are disasters, and my microcosm has experienced a few, some natural and others man-made—sort of like the history of our own planet. Its worst day came when, with a certain bored curiosity that I rationalized as scientific inquiry, I wondered what would happen if I turned the whole jar upside down. The cataclysm lasted hardly 10 seconds, but it precipitated mass extinction. For several days afterward, a yellowish brown cloud hung in the water. I could see nothing; it was sort of like the Neuse River after a heavy rain. When it finally did clear, the pondweed and the snails had vanished, their cozy world smothered. No longer did other creatures zip in and out of focus. My curiosity had caused the equivalent of the big bang theory—or perhaps unleashed something like the meteorite that collided with the Earth 65 million years ago and



KEN TAYLOR

***For more than** 23 years, Ted Dossett's sealed microcosm (left) has sat in the window of his Wildlife Resources Commission office in downtown Raleigh. What began as a curiosity has turned out to be a wonderful lesson in the durable nature of life. Even now, life continues in Ted's world (right).*

threw up a cloud of dust that some scientists theorize spelled curtains for the dinosaurs.

But if nothing else, life is tenacious, and as soon as the mud settled, it began to reappear. Apparently, considerable biological diversity was lost when I turned this closed world upside down, but over time it seems to have recovered somewhat, although it has taken on a certain primeval appearance. An abundance of algae, churning out oxygen and consuming it at the same time, provides forage for a whole colony of water mites I hadn't previously observed. Shaped like stubby pears and about one quarter the size of a pinhead, they graze the thin veil of brown algae clinging to the sides of the jar. I can't begin to guess how many generations of these creatures have come and gone during the past 23 years, but every time I look there are big ones and little ones.

Although this little universe appears well adjusted, just like any other natural system, it faces threats that are not my doing. The water level in the jar has dropped about an inch. And from below, the original handful of mud builds relentlessly upward. A near quarter century of producing and consuming has laid down 4 inches of sedimentation on top of the ½ inch of mud that covered the bottom of the jar at its creation. That's a lot of mud for a biosphere that's only about 6 inches wide and 10 inches deep. But barring a janitor's wayward broom handle knocking it to the floor, at the current rate it should take another 50 to 75 years for the microcosm to fill with mud or dry up completely.

Through the years, I have developed a real affection for this resilient little colony. I overcame my shame and regret for creating such a catastrophe—it was, after all, just a jar full of pond water—but it seems that we are connected, as all living things are. We even share our mortality. During the near quarter century it has sat in my window, it has grown browner as I have grown grayer—we're even eutrophicating together, reaching the limits to our growth.

But most of all, I have learned some valuable lessons from my little enclosed biosphere. As long as I leave it alone, it does very well. If I treat it gently and with respect, it prospers and affords me an opportunity to observe and reflect. Maybe that's a lesson for how we should treat our own little planet. Maybe "what the h... it is" is us. ⊠

Making Your Own Microcosm

To create your own universe (microcosm), get a glass gallon jar and wash it until the odor of dill pickles, or whatever, is gone. Find a pond that has been around for a few years or at least long enough to have a diverse complement of plant, animal and insect life. After you've waded into the pond, squatted down and waited for the bubbles to quit rising and tickling your ankles, scoop up a handful of mud, enough to make a ½- to ¾-inch layer on the bottom of the jar. Next, take a handful of leaves and twigs from the pond bottom, squeeze the water from them into the jar, and then place them in the jar. These "squeezings" contain aufwuchs, or periphyton, the organisms that live on the pond bottom and on the surface of waste vegetative matter. I never could figure out why you have to squeeze the twigs and leaves, since you are going to put them in the jar anyway, but that's what the lab instructor told me to do.

You should also include some emergent vegetation. For obvious reasons the emergent vegetation shouldn't be cattails or other large plants; rather a good choice is elodea, a common pondweed that floats on the surface. As for the order in which the various elements are put in the jar, it's probably best to put the emergent vegetation in contact with the mud bottom so it can take root. Also, for obvious reasons, don't include any large organisms such as fish or turtles in the microcosm.

Finally, fill the jar with water from the pond and tape the top carefully for a complete and permanent seal. Put the jar where it will get sun but not overheat—a windowsill has been the right niche for my microcosm for 23 years. The last step is easy. You do nothing except treat your enclosed universe gently and look at it once in awhile. It could surprise you. I know of one microcosm that turned the color of raspberry Kool-Aid after a couple of days. If things go right and you strike the right balance, you could wind up having a friend that lasts a lifetime.

KEN TAYLOR

***Courtney Cheek** (right) and her brother Nathan collect water, sediment and "squeezings" from a pond to make their own microcosm. It's an easy project, one that is certain to give its maker a better understanding of the natural world.*

Idiot's Guide to Camping

Worried that your first camping trip is doomed to disaster? Follow the advice of the Amazing Camperman and it will be a piece of cake. Trust me.

written by Eddie Nickens ©1997
illustrated by Jackie Pittman ©1997

There's no need for embarrassment. Once upon a time even I, the Amazing CamperMan, had never pitched a tent, built a cooking fire or burned bacon over a camp stove with questionable flame control. How are you to know? If you've never slept outside at night or attempted to pack a large dome tent into a nylon bag the size of a ladies' knee-high, how are you to know what to pack, where to go and how to stake your claim in the bear-filled wilderness (or at least the nearest state park)? Herewith, the Amazing CamperMan releases to the public letters gleaned from years' worth of advice-giving, all designed to gently guide your first camping experience. Enjoy, and don't forget the toilet paper.

Dear Amazing CamperMan,

I know that deep within my breast beats the heart of a hairy wild man, ready to sleep under the stars, burn large quantities of wood and eat food of questionable sanitation. Trouble is, my sleeping bag dates to the days before I had whiskers, and I'd rather not snuggle down in a cotton cocoon emblazoned with Snoopy and the Gang. For a summer weekend in the mountains, what do I need—really need—in the way of tents and sleeping bags and other life-giving shelter? And where do you suggest I acquire this equipment?

Signed,
Sleeping Bag-less in Salisbury

Dear Bag-less,

Amazing CamperMan salutes your forthrightness and humility. Too many camping wannabees hit the woods with equipment that's been stored in the attic since the days when cotton waffle weave was considered a high-tech fiber. And I agree wholeheartedly with your sense of outdoors fashion. You'd never make it past the vestibule of my dome tent with a sleeping bag

©97 JPHansen

boasting a cartoon character.

For a summer weekend for two you'll need what's known as a three-season tent—or a four-season tent if you want to appear more experienced than you truly are. I'm particularly fond of three-person tents, because I like the extra room to stash gear. For the relatively calm winds of the season you needn't spring for a geodesic dome—that's techspeak for a tent that is half-spherical when pitched, with tent poles that lattice the frame so that they form triangles, the strongest geometric shape. More important is that your tent come with a high-quality rain fly with taped and sealed seams to keep rain at bay. And if you're heading out in midsummer, a model with two doors provides a draft that will seem blissful on 70-degree nights.

For this time of year a mummy-style sleeping bag really is overkill; far better to have a roomier bag for ventilation. It is most likely that sleeping bags rated to relatively warm temperatures such as the 40s and 50s will have a synthetic fill, and there's nothing wrong with that. But one thing about a down bag, even one rated to warmer climes, is that it breathes more efficiently than most synthetics, so even on balmy nights you're less likely to feel clammy in a down bag than in a similarly rated bag of fibers such as PolarGuard or Hollofill. Whatever fill you choose, make sure yours has a two-way zipper that enables you to unzip the foot compartment for a bit of cool air.

And don't scrimp on the sleeping pad. Today's best sleeping pads combine two thin layers of closed-cell foam with a pocket of air between them; these "self-inflating" pads are far superior to any combination of spongy open-cell foam pad that I've ever slept on. You can adjust the firmness by adding or reducing the air volume in the pad, and no other piece of equipment will boost the quality of camp life more than a good sleeping pad.

Two bags, a tent, two sleeping pads: All this can be yours for as little as $40—if you rent for the weekend. It's foolish to buy such critical equipment when you're first starting out. Far better to rent three or four times so you can try out different kinds of equipment before investing in your own. Go to a high-quality outdoor retailer, walk straight up to someone who boasts the wild-eyed look of the wilderness buff and say these words: "I am a first-time camping idiot who knows nothing about sleeping on the ground, eating food without first bombarding it with microwave radiation or brushing my teeth with dirt. Help me." They will appreciate your honesty and reward you with the right stuff.

Unless they disagree with any of the aforementioned advice, in which case you may be assured of their lunacy.

Dear Amazing CamperMan,

The last time I went camping, our menu consisted of s'mores for breakfast, Pop-Tarts for lunch and canned meat for dinner. Tell me, CamperMan, what must I do to dine at a higher level?

Signed,
Greasy 'n' Queasy

Dear Queasy,

I am with you, my friend. The things I have found in a can of tinned meat would keep a herd of Smithsonian paleobiologists busy for months. But fear not, for I bring you tidings of great dining afield, if you but follow these simple maxims:

Emulate. It's dark, the kids are tired and there are three poles left over after erecting the tent—this is not the time to try and cook some new dish that you just know will work on a campfire. Stick with the tried at home and true. Quick-cooking pastas, spaghetti, hamburgers—all these are good first-time camping fare because they are nearly

fail-proof. Borrow or rent a camp stove—if you're new to this game, don't even think about cooking on the fire. I know, I know: When you were a Cub Scout, you cooked this great hamburger meal with veggies and butter and Lawry's Seasoned Salt all wrapped in foil and tucked into the hot coals. But when you were a Cub Scout, you didn't mind hamburger burned to resemble asphalt shingles and potatoes that crunched like Granny Smith apples, now did you?

Prefabricate. Who wants to be chopping vegetables while everyone else is cavorting amidst the forest, snoozing in the shade or trying to pull the dog away from an unidentifiable but intensely aromatic natural substance? Do as much prep work for your meals as possible before you leave the house. Make your spaghetti sauce, break your eggs and store them in a plastic bottle, fashion and freeze hamburger patties, and buy pre-grated cheese.

Delegate. Much of the fun of camping is the whole dining process—why should one person do all the work? Assign different tasks to your companions, or better yet, divvy up the meals and have each person solely responsible for buying, packing and cooking a specific meal.

Dear Amazing CamperMan,

I, too, have seen the idyllic photographs that accompany advertisements for outdoor gear: tents silhouetted against rosy sunsets and smiling children happily playing jacks while ruddy-faced parents gather around the campfire. I want to live the CamperMan life but don't know where to go. Should I try the mountains or the sea, camp streamside or on ridgetop? Where do you suggest the neophyte first pitch his rental tent?

Signed,
Locationally Challenged

Dear Challenged,

While you are to be commended for your choice of mentors, CamperMan is nonetheless a bit concerned that you have an unrealistic vision of life beyond the sheetrock. Camping, even when performed with sophistication and artistry, is often a dirty business and sometimes an uncomfortable one. Not infrequently does the fire fail to blaze, the sun fail to shine and the children fail to find anything amusing about holding a hot dog aloft in the flames and searing their own knuckles in the process. Be realistic and flexible.

That said, consider yourself blessed to be a North Carolinian, for our state parks offer the finest testing grounds for newborn campers imaginable. Many offer a bit of segregation between trailer and recreational-vehicle campers and tent campers, and the bathhouses are clean and the tent pads well drained. Whether you live in the Mountains, Piedmont or Coastal Plain, there is a state park campground within a couple hours' drive of your house, and many offer access to fine wilderness for day hikes. From Mt. Mitchell State Park you can hop on a number of backcountry trails through the Black Mountains. In Hanging Rock State Park a superb trail system will carry you to waterfalls, deep forests and surprising views of the western Piedmont. If you're truly adventurous for a first timer, Hammocks Beach State Park offers solitude, a sandy campsite and some of the finest beachcombing in the state. For my money I'd stay away from often jam-packed campgrounds at lakeside state parks. Too often these are frequented by unsavory types that drive jet skis and haul gasoline generators around in their pickup trucks so they can power up a television set on the picnic table. If you're tent camping, it's always a good idea to put as much space between you and RVs as possible; their generators often create a bothersome all-night hum, and the ready availability of electricity makes it all too easy for their owners to blast the rest of the campground with unwelcome light and noise.

Dear Amazing CamperMan,

I'll admit it: I'm hooked on curling irons, lighted mirrors and Laura Ashley sheets, but the man I love is a manly man and desires that I share the night with him in the forlorn wilderness. I have agreed but fear the asperity that might accompany such an experience. Tell me truly, CamperMan: What does a woman like me need to know to turn a backcountry hovel into a home?

Signed,
Willing But Not Quite Ready

Dear Not Quite,

CamperMan, though a man in the fullest sense of the word, hears your cry. Many of my hirsute gender revel in the more grimy aspects of the wilderness experience, and the further they can camp from a flushable toilet, the better. For many women, however, there are but two kinds of camping: electrically supported and non-electrically supported. This, sadly, is a fact too many men fail to comprehend. Domestic tranquility in the woods, however, often depends totally on the balancing of these two philosophies.

I might suggest that first you and your man agree on the acceptable distance between your exquisite tresses and the nearest electrical outlet. If you absolutely, positively cannot and will not greet the new day without the assistance of rapidly moving electrons, let it be known early in the negotiations. Your choices of campsites will necessarily be limited to some state park and commercial campgrounds. If this is the case, your man might stamp his feet and wail loudly and call you ugly names and otherwise vent his frustrations as men are wont to do, but hold your ground. Even D. Boone knew this of Rebecca: If mama ain't happy with the bathroom facilities, ain't nobody happy.

Once the decision has been made as to electrical accessibility, much of your personal comfort will be decided by how well you can duplicate your home environment when faced with a rough gravel tent pad. Demand first that you command the home nest, and make sure that there is more between your creamy white shoulders and the beasties of the ground than a thin veneer of nylon. Bring along quilts and pillows, if you like, and make sure that your man has rented or acquired more than a rudimentary piece of foam to cushion your sleep. Be equally vigilant regarding meal preparation. If you require soap for dishwashing, best to pack it yourself.

The Amazing CamperMan's wife even has a few hints from her many nights on the trail. She suggests that you pack the following items: a small mirror to aid in the morning beautifying process; a shaving razor, no matter how far you venture into the woods ("I've shaved in many a creek," she explains, "and it just makes me feel better no matter how long it's been since I took a shower"); your personal stash of toilet paper; and your own flashlight, for in the darkened woods personal control of light will help establish your independence. She also suggests that you limit hair accessories to bandannas and soft elastic ponytail holders, wear a sports bra with a wicking liner, and separate socks, underwear, T-shirts and shorts into small plastic bags to keep them within easy reach in the dark.

And bring along some kind of beach chair, she says. After all, you've agreed to accompany your manly man on his wilderness quest. Surely he doesn't expect you to help out with all those camp chores. ⊠

Disabled Anglers Can Now Reach Good Spots

Wildlife Commission Providing Universal Access to Trout Waters

Written and Edited by Rodney Foushee

Trout fishing in the North Carolina mountains can provide one of the most rewarding angling opportunities around. Rugged terrain, steep streams and fluctuating water levels only add to the challenge of trying to fool wary mountain trout. While these terrain hurdles can be overcome by most able-bodied anglers, they can prove permanent barriers to success for the physically handicapped.

The rugged terrain also makes building universal fishing access areas in the mountains particularly challenging. But that hasn't stopped the N.C. Wildlife Resources Commission from teaming up with other public and private groups to construct piers, platforms and paved paths to give disabled citizens a chance at wild and stocked trout.

In keeping with the guidelines established by the Americans with Disabilities Act, the Wildlife Commission has made it a priority to provide access for all anglers—regardless of physically ability—on designated public mountain trout waters. Over the past 10 years, the Commission has provided universal access piers and pads on 10 different mountain streams and lakes under different regulation classifications to allow wheelchair-bound and blind anglers a chance at a variety of fish. And that list will continue to grow.

"We are trying to make universally accessible as many of our mountain streams as we can," said Paul Pittman, a Wildlife Commission fisheries technician who specializes in fishing access projects. "Our goal is to have at least one universal fishing access on each stream classification." With the existing improvements, disabled anglers now have access to hatchery-supported, delayed-harvest and wild trout waters. Fishery technicians are also in the process of working with Trout Unlimited volunteers to provide such access to catch-and-release waters on the Davidson River in Transylvania County.

Many of the improvement projects are paid for with Sport Fish Restoration Act funds collected through special federal taxes on fishing equipment and boating fuel. But important funding, work and assistance has also been provided by the U.S. Forest Service, N.C. Trout Unlimited, South and Stone Mountain state parks, the Ashe County Wildlife Club, the town of Waynesville and Pathways for the Future, a private group that promotes equal access for all citizens. "Without the help of these groups, many of these accesses would not be possible," Pittman said.

To obtain an access guide to statewide fishing, boating and hunting opportunities for the disabled, call the Wildlife Commission's Division of Boating and Inland Fisheries at (919) 733-3633.

JON SERENIUS

***Through cooperative projects** with public and private organizations, the Wildlife Commission has provided universal angler access to 10 mountain trout streams and lakes including Richland Creek (above) in Waynesville. More projects are planned for the future.*

May and June

Youth Outdoor Conservation Events Set

Two youth outdoor conservation events sponsored by the N.C. Wildlife Resources Commission are planned for the coming months.

A Youth Hunter Conservation Education Field Day will be held May 17 at Mill Ridge Fields in Hot Springs. The event, sponsored by the Wildlife Commission, the U.S. Forest Service and several private hunting organizations, will provide activities for youths ages 9 to 15 to learn the legacy of safe and ethical hunting and forest management.

The free event, which is open to the first 125 registered youths, will feature turkey and elk calling seminars, wildlife and forestry management activities, an upland game bird dog demonstration and shooting ranges. Wildlife Commission hunter safety instructors will provide firearms and supervise all shooting. All young people must be accompanied by a chaperone. To register or for more information, call (704) 622-3203.

The 15th annual Fur, Fish 'N Game Rendezvous camp will be held June 15-20 at the Millstone 4-H Camp near Ellerbe.

At the rendezvous, campers ages 12 to 15 will study topics including wildlife and forests, environmental ethics, wildlife photography, fishing, canoeing, archery, rifle marksmanship, orienteering and first aid. Certified hunter-safety classes will also offered. All courses will be taught by qualified professionals in their respective fields.

A new advanced camp is open to youths who have successfully completed the first camp and are interested in an outdoor resources career. Advanced campers will learn more detailed information about prescribed burning, wildlife surveying, estimating timber value, wildlife, bird and tree identification and advanced orienteering.

The rendezvous is sponsored by the Wildlife Commission, the N.C. Cooperative Extension Service, the N.C. Wildlife Federation, the Wake County Wildlife Club and the N.C. Bowhunters Association. Regular registration costs $215 per youth. Space is limited to the first 85 new campers and 30 advanced campers. For more information, call David Drake or Scott Payne at (919) 515-5636.

N.C. WILDLIFE RESOURCES COMMISSION

***Wildlife management and** hunter-safety training will be offered at two youth conservation education events sponsored by the Wildlife Commission in May and June.*

Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

May 3-10

International Migratory Bird Day celebrations will be held at parks and wildlife refuges across the state. All-day festivals are set for May 3 at the Western North Carolina Nature Center in Asheville and May 10 at the N.C. Zoological Park in Asheboro. For more information, call the nature center at (704) 298-5600 or the zoo at (800) 488-0444.

May 17-23

National Safe Boating Week will be observed during the week immediately preceding Memorial Day.

May 23-25

A Sportsman's Retreat will be held on the Drexel Community Fairgrounds in Drexel. The three-day event will feature outdoor speakers and discussions on various topics including deer and turkey hunting and management as well as freshwater fishing. For more information, contact Danny Ritchie at (704) 433-1440.

May 24

The eighth annual Great Smoky Mountain Trout Festival will be held at the Waynesville Recreation Park in Waynesville. Events will include a traditional wooden trout race, live entertainment, hiking and fishing equipment displays, flycasting demonstrations, conservation education displays and food and drinks. For more information, call (704) 456-3575.

You Can Write for Free Seeds

Crimson-Eyed Rose Mallow is N.C. Wildflower of the Year

The crimson-eyed rose mallow (*Hibiscus moscheutos*) has been selected as the 1997 North Carolina Wildflower of the Year.

If you are a frequent visitor to any of North Carolina's many wet habitats, you have probably noticed the large white flowers of this giant native wildflower. Even from 100 paces, the tower of flowers beckons for a closer look.

When mature, this shrubby perennial gets 4-6 feet tall. Plump, conspicuous flower buds cluster at the tip of each stem and open several at a time. The blooms—the largest of any of our native perennials—are made up of five creamy white petals that overlap to form a wide flaring funnel. A garnet eye rings the flower's center and accounts for the common name of this magnificent summer bloomer.

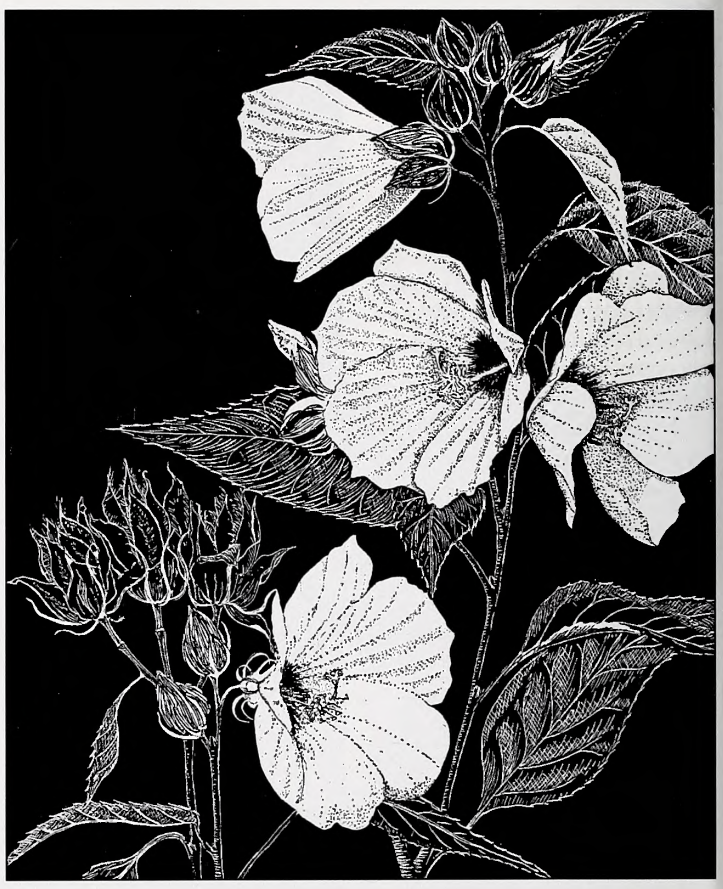
In the Piedmont, crimson-eyed rose mallows usually bloom for three to four weeks beginning in early July. But seeds may be sown anytime during the growing season.

The crimson-eyed rose mallow, found in damp or wet sunny sites in the wild, thrives in similar conditions in the home garden. As a bonus, this wild hibiscus is a real favorite of hummingbirds. To attract both hummers and butterflies to your garden, plant crimson-eyed rose mallow next to Joe-pye weed—a choice plant of butterflies.

The Wildflower of the Year project, now in its 16th year, is a cooperative program between the Garden Club of North Carolina and the N.C. Botanical Garden at the University of North Carolina at Chapel Hill.

For a packet of free seeds and an informational brochure on the crimson-eyed rose mallow, send a stamped, self-addressed business-sized envelope to: 1997 WFOY, N.C. Botanical Garden, Campus Box 3375, UNC-CH, Chapel Hill, N.C. 27599-3375.

—Courtesy of Rob Gardner, N.C. Botanical Garden



Most Who Drown Don't Wear Them

National Safe Boating Week Stresses Life Jacket Use

More than 800 people die in boating-related accidents each year, and drowning is the leading cause of death, according to U.S. Coast Guard statistics. Tragically, many of these deaths could be prevented with the use of inexpensive life jackets.

"Three out of four of the drowning victims were not wearing life jackets," said Jerry Scannell, president of the National Safety Council. "It's simple. Life jackets save lives."

Sponsored by the Coast Guard, and produced by the National Safety Council, National Safe Boating Week—May 17-23—stresses the need to wear a life jacket with the theme "Life Jackets. They Float. You Don't."

"The goal is to educate the public that a life jacket can save their life," said Coast Guard Rear Admiral James D. Hull. He noted that wearing life jackets is essential because most boating accidents occur when someone falls overboard or the boat capsizes. And even experienced swimmers lose coordination and drown. Heavy clothing, alcohol consumption and cold water can also be factors in drownings.

The Coast Guard and the National Safety Council offer these tips for using a life jacket:

•Buy your own personal life jacket and use it. One size does not fit all. Look at the label. It will provide weight and size information.

•Try it on to check the fit. Once the straps and buckles are secured, it should not slip over your head or come above your ears.

•Never use water toys in place of a Coast Guard-approved life jacket.

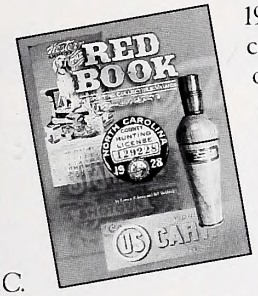
•Throw away a life jacket if you find air leakage, mildew or rot. Check your life jackets yearly for flotation and fit.

•Wear a life jacket to set an example for younger children while you increase your chances of survival.

—Information courtesy of the National Safety Council

Book Review

The Red Book of Sporting Collectible Values



The Red Book of Sporting Collectible Values *by R.L. Roberts and Bill Birkbeck. Published by Dixie Sporting Collectibles, 1206 Rama Road, Charlotte, N.C. 28211. Color and black and white photos, soft cover. $29.95 plus $3 shipping and handling.*

Although seemingly everyone is collecting sporting memorabilia of one type or another these days, it can still be hard to get a handle on values. Since *The Red Book of Sporting Collectible Values* is a compilation of prices paid for approximately 7,000 described items that have been sold at auctions, it could be useful in helping compare prices. The cover features a 1928 North Carolina county hunting license, one of 33 categories ranging from calendars, old ads and art to knives, guns, bullets and shot shells—even a few western and Indian items—but no lures or other fishing tackle.

Some categories are very limited, but others—shotgun shell boxes, for example—contain lots of examples. Unfortunately, the pages aren't numbered and the nice color photos aren't keyed to described items. Also, since the prices reflect winning bids, they aren't always indicative of the true value (wouldn't you love to find dot pattern, stag-handled Case knives at $10 apiece?) Still, there are lots of odd sporting items listed, and the serious collector may find this an interesting reference.

Restoration and Preservation Efforts Worthwhile

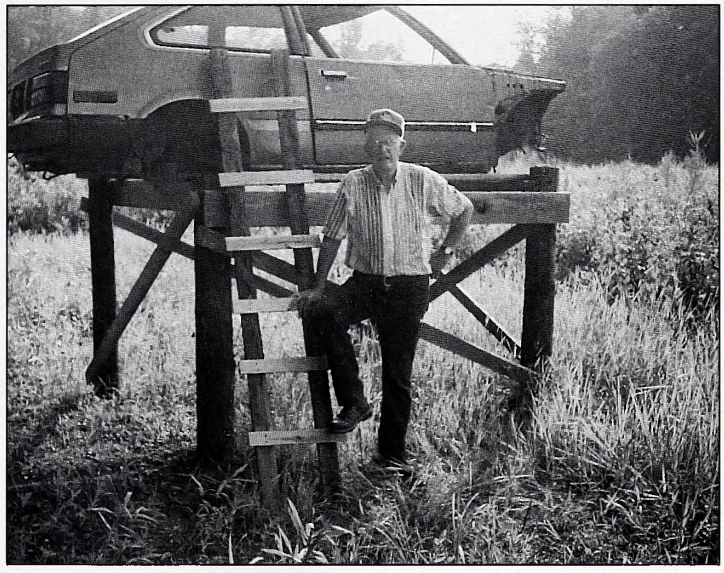
Federation Honors Commission Employees

BODIE McDOWELL

A Wildlife Commission technician and an enforcement officer were both honored recently by the N.C. chapter of the National Wild Turkey Federation during the chapter's annual convention in Greensboro. The two received the organization's Professional Category awards for their efforts in the restoration and preservation of the wild turkey. Receiving awards from chapter President James Long, left, are Wildlife Technician III Vic French of Burgaw, second from left, and Master Officer Steven Long of Trenton. Wildlife Commission Chairman John Lentz of Ellerbe, right, looks on.

Reader Bags Deer

Car Stand Proves Useful



***Donald Herring** and his car stand.*

Dear Wildlife,

Every year you hear of people getting hurt falling from deer stands. Most of them are not elderly, just people in unsafe tree stands or in too much of a hurry.

My father, Donald, is 73 and he has come up with one way to hunt safely out of the weather. An avid hunter his entire life, he still loves the sport. But he's been getting apprehensive about climbing a tree.

So, Dad came up with the idea of putting a car stand—made of a stripped-down car body—on our farm. First, he got an old car body without an engine, front or side glass and took the front seats out so he could sit in the back comfortably. Then we took four cut-off telephone poles and built a support to hold the car on top. Dad built a good sturdy ladder so he can climb up to the car, just open the door and get in. This gives him a clear view from about 10 feet up.

I thought this was an inventive idea to build a stand that was safe and comfortable. It also gives a place to hunt out of the rain. Just a final note, my father took a nice buck from this car stand. And it happened to be raining at the time.

—Pat Herring
Dudley, N.C.

Got a Gobbler?

Call **1-800-I-GOT-ONE**
to report your turkey harvest.

**All bearded birds harvested during the April 12-May 10, 1997 turkey season must be reported via the toll-free telephone reporting system.*

Catch Us at These Numbers

1-800-662-7137
to report violations of hunting and fishing laws.

1-800-628-3773
(NC VESSEL) for boat registration and titling.

1-800-675-0263 for hunting dates and shooting hours for migratory game birds.

1-888-248-6834 (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.

1-800-446-8663 (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through January 1997

Principal Balance
$23,548,241.36

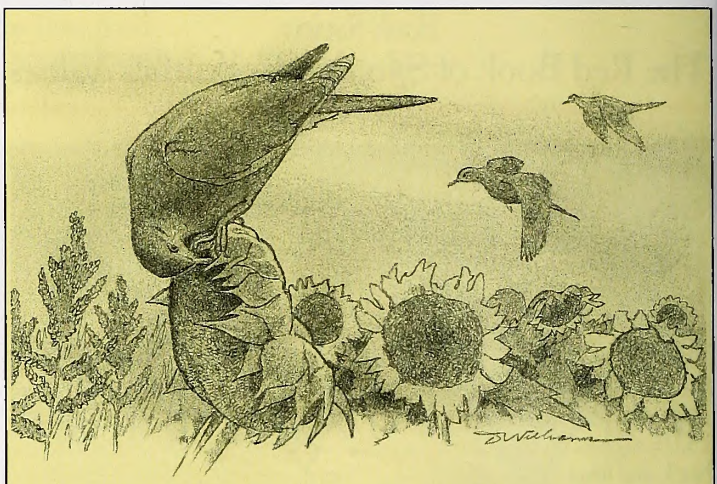
Interest Earned
$21,767,091.58

Total Receipts
$45,315,332.94

Interest Used
$10,049,660.04

Fund Balance
$35,265,672.90

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission, programs, the principal remains invested to generate additional interest for the future.



Planting for Doves

by Rodney Foushee

Even though the season is months away, now is the prime time to prepare dove fields for fall hunting.

May is the right month to start planting some of the dove's favorite foods. And by using strips of different grain crops, a single spring-planted field can attract doves throughout the hunting season.

At the top of the list, millet should be planted by the end of the month. Since doves are attracted to most varieties of millet, several types can be planted to provide a steady food supply through the early hunting season. Browntop millet, which generally matures in 65 days, can be planted as late as mid-June to provide excellent dove food for opening day. Dove Proso millet matures in about 90 days and lasts longer. Both millet varieties should be sown at 5-25 pounds per acre.

Sunflowers, late-maturing corn and grain sorghum strips can be planted through June to attract late-season doves. Black, oil seed sunflowers sown by early May will also draw plenty of opening-day birds. Besides feeding doves, songbirds and other wildlife in the fall and winter, these food plots provide cover and breeding areas for rabbits and quail in the summer.

Spring planting also helps avoid legal problems with hunting doves over baited fields during the fall. Federal regulations prohibit dove shoots where grain, salt or other food has been recently scattered to attract birds. But hunting over fields sown in the spring to benefit wildlife or for agriculture is perfectly legal.

To help farmers and hunters better understand how to legally prepare dove fields and hunt over them, the Wildlife Commission has produced a free guide, *Dove Hunting in Agricultural Areas*. A free list of commercial sources for wildlife planting materials is also available. Both publications can be obtained by writing the N.C. Wildlife Resources Commission, Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Or call (919) 733-7291.

Wildlife Commission **Spotlight**

HURRICANES: Counting the Cost

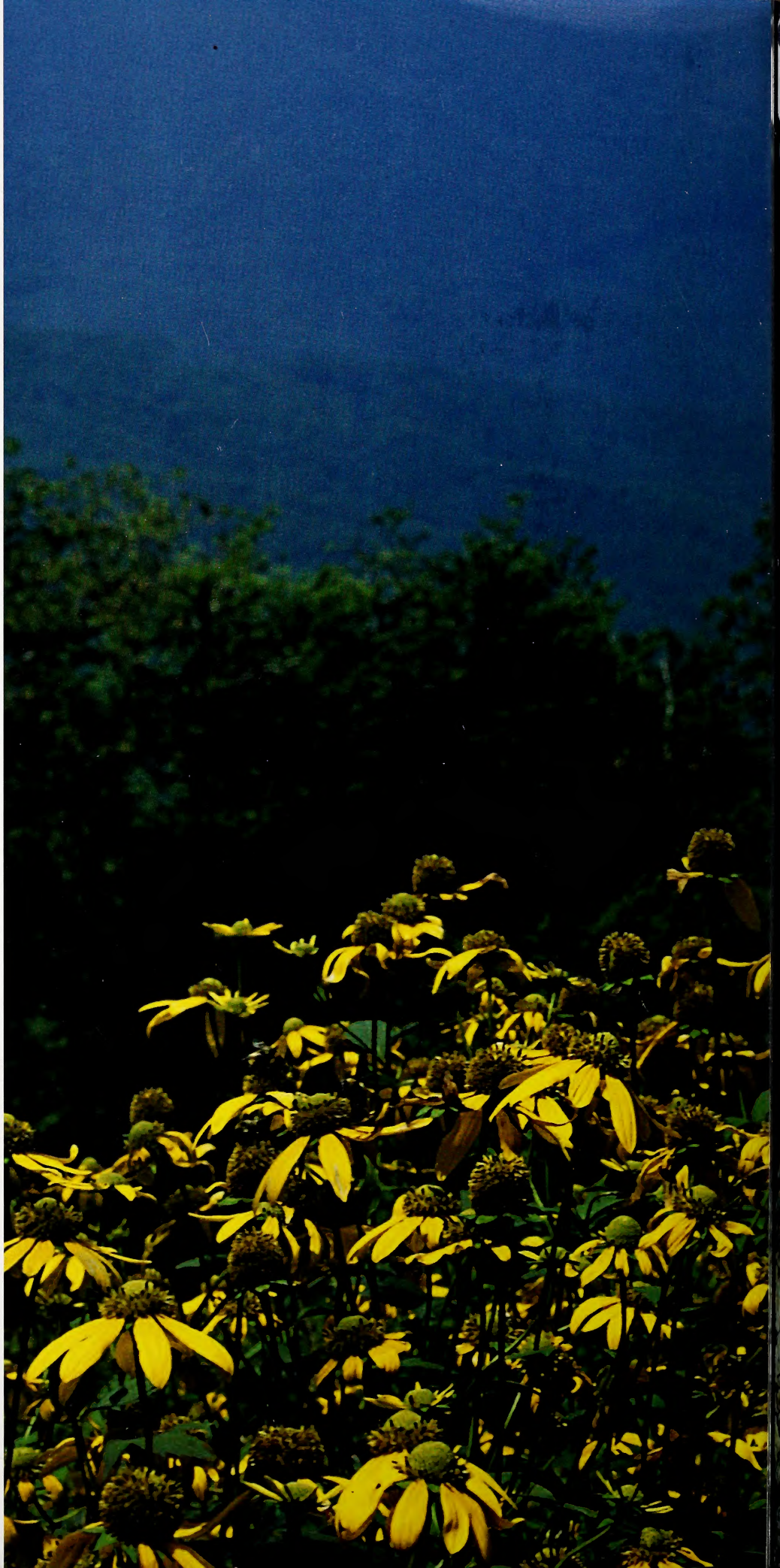
The residents of the coastal and Piedmont regions of North Carolina were not the only creatures to suffer the devastating consequences of hurricanes Bertha and Fran.

Almost 75 percent of all fish kills reported during 1996 were attributed to the hurricanes. Tens of thousands of dead fish were reported from the Perquimans River south to the Cape Fear River, west to Davie County, and all areas in between. No species or size class of fish was spared. Largemouth bass, sunfish, catfish, pickerel, carp, suckers, shad, perch and eels died as a result of low dissolved oxygen conditions.

The fish were killed as a result of excessively high rainfall that flooded swamps, municipal sewage plants, septic tanks and lagoons from animal production facilities. The flooding released large amounts of organic matter into our streams and rivers which depleted oxygen levels. No one knows how long it will take for some of our hardest hit rivers to recover from the effects of the hurricane. Some fish are able to survive by moving into areas unaffected by poor water quality, areas such as tributaries, headwater streams or near springs. Fish from unaffected areas typically migrate and recolonize depleted areas.

To help speed the recovery, the Boating and Inland Fisheries Division of the N.C. Wildlife Resources Commission has stocked almost 300,000 bluegill, redear and redbreast sunfish fingerlings donated by the S.C. Department of Natural Resources. And in 1997, fisheries technicians will stock 60,000 largemouth bass fingerlings produced at Watha State Fish Hatchery.

Photographs by Ken Taylor



High on Roan

Many handsome wildflowers and other unique plants—some rare—grow on our mountain balds. These yellow coneflowers on Roan Mountain may be fairly common, but their beauty isn't.

Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:61/6

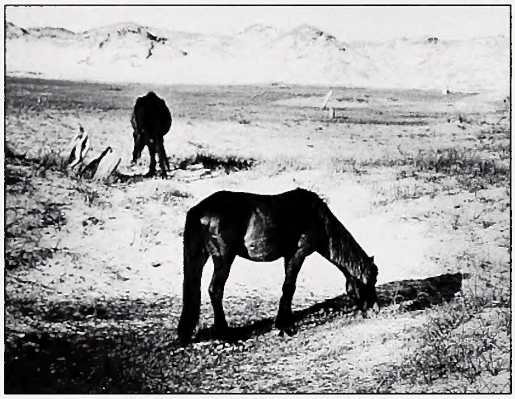
WILDLIFE IN NORTH CAROLINA

JUNE 1997 $1.50

Horses and Beaches

by Jim Dean

Occasionally an issue comes along that alienates sincere people on every side. That seems to be the case with the controvery—current as of this writing in mid-April—concerning feral horses that live on half a dozen mid-Atlantic barrier islands, and particularly Shackleford Banks which is a part of The Cape Lookout National Seashore. If you love horses, beaches or both, you know the story.



JANE ROHLING

Feral horses have roamed freely on Shackleford Banks for as long as anyone can remember, and legend has it that they are descendants of Spanish mustangs left by early explorers or abandoned after shipwrecks some 400 years ago. Until Shackleford became part of the National Seashore in the mid-1980s, an annual round-up was held by local people. Since then, the horse population on Shackleford has grown, and the general health of the horses—never that good—has deteriorated. The Park Service's attempts to control the horse population have drawn fire from those who value the horses as a historical attraction and are concerned about their welfare. Added to this is the discovery that some of the horses were found to have an infectious disease that could pose a threat to domestic horses on the mainland if the island horses are moved.

In recent months, the exchanges have become increasingly heated among horse lovers, history buffs, mainland horse breeders, the Park Service and various other groups. But some vital points seem to be getting overlooked.

First, relatively little has been said about the plight of the native flora and fauna of Shackleford Banks. Regardless of how these horses got to these islands, or how long they have been there, they aren't native species and certainly did not predate the native plants and wildlife that lived there before the first hoof hit the sand. The fact that horses have had a significant and detrimental long-term impact on these native species is beyond debate. While the impacts of overgrazing have been reduced in recent years, the island's habitat is still far removed from what it was historically. We humans have also had major impacts here—on the 3,000-acre island once dominated by maritime forest, only 90 acres of forest remain. Horses didn't cut those trees, although they may have curtailed their natural regeneration.

There's also the matter of the horses themselves. The bloodlines of the horses living on Shackleford Banks now—regardless of what they originally were—reflect over 200 years of semi-domestic stock pastured on the island. Early island settlers living at the Diamond City whaling community and mainlanders over the years have used these barrier islands to pasture all sorts of livestock, moving animals on and off, letting them breed and multiply. It made sense—no fences to build—and it was a common practice, resulting in a tangle of bloodlines that only a geneticist could unravel.

If these aren't relatively purebred 16th-century Spanish stock as some apparently believe, then what evidence exists that these horses might have any connection to their legendary status? Dr. E. Gus Cothran of the Department of Veterinary Science at the University of Kentucky has previously conducted genetic studies of the bloodlines of feral horses on six barrier islands, and he is currently wrapping up an intensive blood study of approximately 145 Shackleford Banks horses (to be released this summer). "Certainly these horses aren't pure descendants, but there are genetic markers present in all these barrier island populations that are seen only in horses from the Iberian Peninsula (Spanish ancestry)," he says. "We can't be certain that this hasn't come from the mainland at some point, and we can't say that it is clearly linked to old Spanish blood, but it appears that this connection has been on the island for awhile, at least since the last century. There is a clear Spanish link here, but we may never know for certain how it got here or whether it arrived on these islands 400 years ago, or more recently."

But does this Spanish ancestry business really matter? There are those who argue that these feral horses have significant historical status on Shackleford and the other barrier islands regardless of their descent—which is another way of saying that, after a century or more of residence, the horses may have earned as much right to impact a few barrier islands as we humans have to screw up the rest of the coast.

Dr. Michael Rikard, resource management specialist for Cape Lookout National Seashore, believes a compromise is feasible. If—a big if—the threat of infectious disease to mainland horses can be eliminated, isn't it possible to perpetuate a heritage many people have come to treasure by maintaining a smaller, more healthy, controlled population of island horses perhaps confined to certain areas as has been accomplished on other barrier islands? And couldn't this be done while pursuing the arguably more important, and sadly overlooked, business of restoring and protecting the habitat for true native plants and wildlife on these public lands? Is that yea, or neigh?

June 1997
Volume 61, Number 6

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Ovide E. de St. Aubin/Siler City
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John W. Parks III/Gastonia
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

CONTENTS

4 Winds of Change *written by Rodney Foushee*
Hurricanes have been shaping eastern North Carolina's natural environment for thousands of years. Though last summer's storms caused problems for some wildlife species, there were benefits, too.

12 Fishing the Floaters
written and photographed by Gerald A. Almy ©1997
Catching bass on topwater lures is not only more fun, it's probably more effective than you think.

16 The Last Turpentiner *written by Lawrence S. Earley*
Aubrey Shaw may have been the last North Carolinian to tap the longleaf pines for those products so closely connected to our "Tar Heel" heritage and identity—tar, pitch, rosin and turpentine.

22 Frog Nights *written by David Lee* ©1997
What sort of people would spend the evening hip-deep in the water, gnawed on by mosquitoes, trying to catch musical amphibians? Only those who love 'em.

26 Licenses to Go! *written by Rodney Foushee*
photographed by Melissa McGaw
Beginning next month, all North Carolina hunting, fishing and trapping licenses and permits will be sold by license agents statewide through a new computer system. Here's what to expect.

N.C. DOCUMENTS
CLEARINGHOUSE

DEPARTMENTS

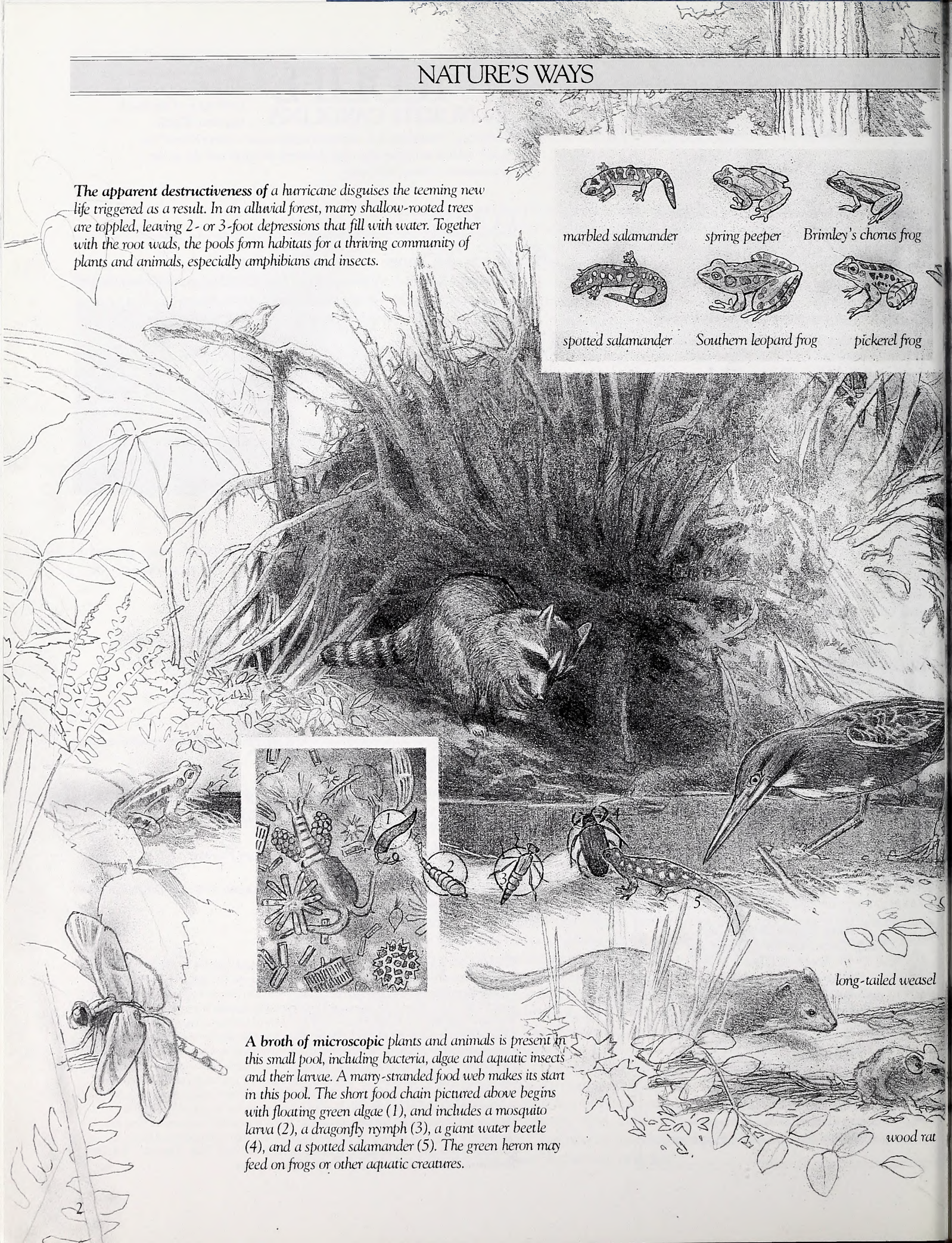
Our Natural Heritage *by Jim Dean*
Nature's Ways *by Lawrence S. Earley*
Back of the Book *by Rodney Foushee*
Wildlife Through the Year *by Rodney Foushee*

JUN 2 1997
STATE LIBRARY OF NORTH CAROLINA
RALEIGH

Cover *This gray tree frog might be easy to overlook on this lichen-covered branch. Photographed by Jack Dermid.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and additional offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, P.O. Box 29607, Raleigh, N.C. 27626-0607. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

The apparent destructiveness of *a hurricane disguises the teeming new life triggered as a result. In an alluvial forest, many shallow-rooted trees are toppled, leaving 2- or 3-foot depressions that fill with water. Together with the root wads, the pools form habitats for a thriving community of plants and animals, especially amphibians and insects.*

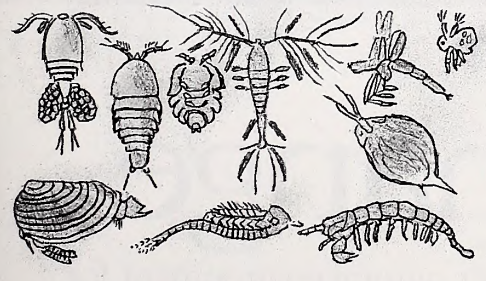


A broth of microscopic *plants and animals is present in this small pool, including bacteria, algae and aquatic insects and their larvae. A many-stranded food web makes its start in this pool. The short food chain pictured above begins with floating green algae (1), and includes a mosquito larva (2), a dragonfly nymph (3), a giant water beetle (4), and a spotted salamander (5). The green heron may feed on frogs or other aquatic creatures.*

After the Storm: Pools

written by Lawrence S. Earley/illustrated by David Williams

The root wad *offers nesting habitat for the Louisiana waterthrush and other birds in spring. Bats use the roots for their roost. Snakes like to curl up inside the roots, salamanders crawl about, and spiders spin their webs.*



Because the pool *disappears in dry periods, it is called an "ephemeral" pool. It contains a community of insects, freshwater shrimp, clams and multitudes of plant-shredding crustaceans (sowbugs, pillboxes and scuds).*

After the hurricane winds ceased their shrieking, what happened to the floodplain forest? Numbers of huge cherrybark oaks, sweetgums, shagbark hickories and other trees littered the landscape like pickup sticks. The saturated soils couldn't support them and many tipped over, leveraging their shallow root systems entirely out of the ground and leaving depressions that filled with water.

It's easy to mark the destruction, harder to see the new opportunities for life that these new conditions create. The fallen trees leave gaps in the forest canopy that serve a critical function. Triggered by the sudden light burst in the openings, dormant plant seeds will sprout and seedling trees will renew the forest.

That will take years, but within hours new life is stirring in the pools. It starts, of course, as does any food web, with the plants. Bacteria and algae become active and multiply in the water. Diatoms and other phytoplankton cover the dead leaves. Pioneer plants quickly invade the pool edges. Visiting birds, mammals and even snakes and insects unwittingly carry plant seeds and insect eggs to the pool and these add to the mix of life.

Flying insects find the pool a few hours after the storm and lay their eggs. Mosquito larvae hatch from the eggs, hang from the water surface and feed on the green algae in the water. Leaf packs of dead leaves become slick with bacteria and fungi and are colonized by a soup of tiny crustaceans—scuds, aquatic sowbugs and water fleas. These vegetation shredders specialize in breaking down dead leaves and releasing nutrients to be used again by the plants. Large-sized crustaceans reduce leaf litter to smaller bits which are then broken down by smaller crustaceans.

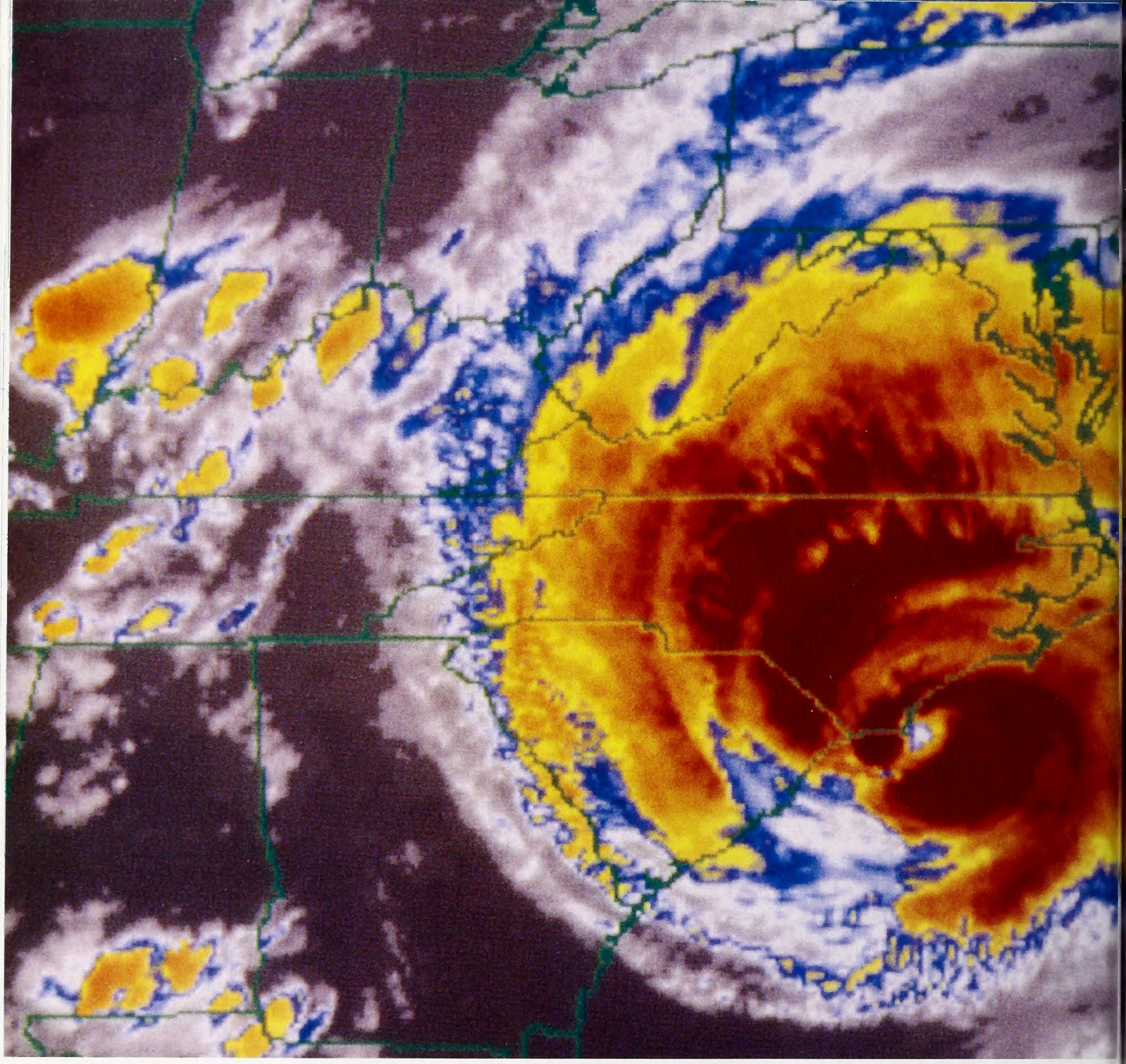
The tiny herbivores and detrivores that feed on the natural salad bar of plant life, living and dead, attract fleets of fearsome insect predators. Suddenly the pool is full of water boatmen, backswimmers, water striders and lethal-looking giant water beetles 3-inches long that can suck the life out of a small frog. Winged insects such as dragonflies and damselflies lay eggs on the pool surface. Their larvae are skilled hunters themselves, prowling the pool and ambushing the unwary. In the shallow water column, pale ghosts of midge larvae float up and down, feeding on microscopic crustaceans.

In this small, still, aquatic world, other species have found a purchase. Crayfish burrow in the soft mud, aquatic snails move about on the leaf pack. Marbled salamanders, spotted salamanders, spring peepers, upland chorus frogs and other amphibians have discovered this tiny pool. They feed on the aquatic insects, on the worms burrowing at the bottom. Here they breed and lay their eggs, becoming part of the food web themselves.

Larger animals are drawn here, too. Raccoons paw in the water for crayfish. Opposums and foxes sniff the edges. Great blue herons and other wading birds feed here in the fall when they disperse inland. Deer will bend low for a drink, leaving their tracks behind.

When the shallow pool dries out during the year, some creatures—burrowing worms and some insect larvae, snails that can seal the openings of their shells—are able to survive until it floods again. But the life of this pool is limited. In a few decades, the depression will fill with decaying vegetation and no longer fill with water. Until then, it will act as a mecca for wildlife.

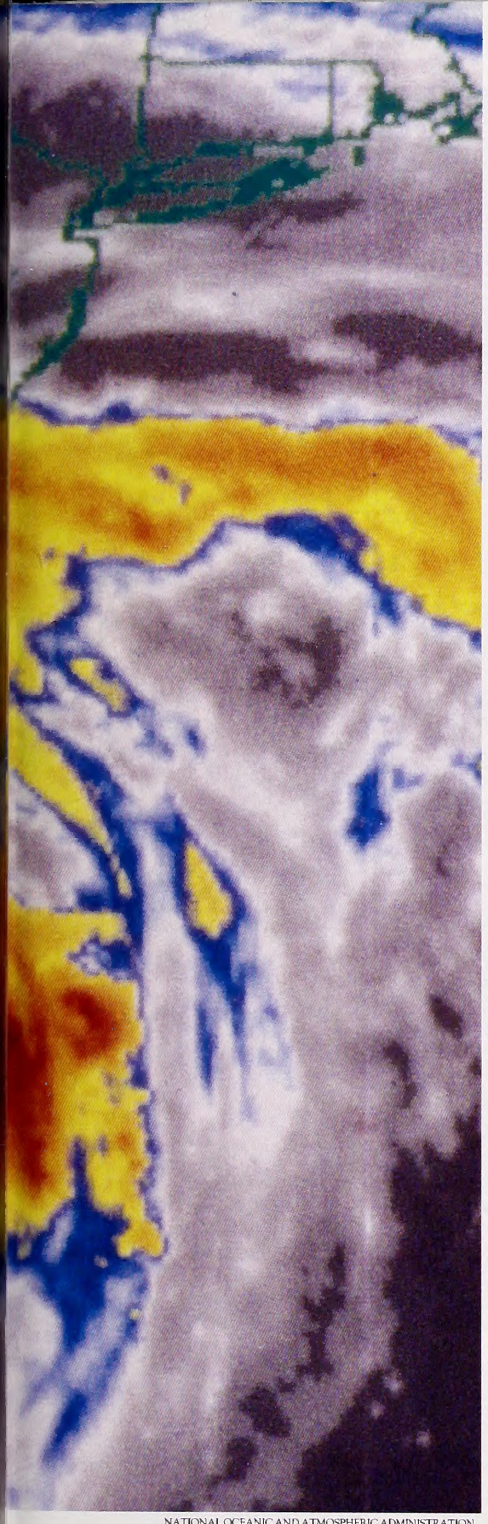
Born from the destructive trauma of a hurricane, the seasonal pool contains a thriving community that offers surprising diversity to the forest.



Winds of Change

Hurricanes have been shaping eastern North Carolina's natural environment for thousands of years. Though last summer's storms caused problems for some wildlife species, there were benefits, too.

written by Rodney Foushee



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

For more than 30 years, the North Carolina coast dodged a direct hit from a major hurricane. In the summer of 1996, Mother Nature made up for her peace with a one-two punch that reminded us just how vulnerable we really are.

Hurricane Bertha kicked the storm season off early, arriving in July packing 105-mile-per-hour winds. As we huddled safely inside our homes and waited for the shuddering winds to pass, who could have guessed a more powerful tempest was heading our way?

In September, Hurricane Fran surged ashore with 115-mph sustained winds and record-breaking rains. From the Tar Heel coast to the Piedmont, few were spared the massive storm's fury. Once the winds had calmed and the floodwaters receded, we emerged to document our loses. With a staggering $5 billion price tag and destruction across more than half the state's counties, Hurricane Fran stands alone as North Carolina's most costly disaster. Many are still busy picking up the pieces nearly a year later.

While most of us were able to seek shelter in our homes, our natural communities and their wild inhabitants took a real beating with little reprieve. More than 8 million acres of forests were damaged as trees were snapped and broken wholesale by the howling winds and uprooted with the help of saturated soils. Hundreds of thousands of fish were killed as floodwaters flushed millions of tons of organic debris into coastal rivers and streams. Sea turtle nests were washed away by the hundreds, and bewildered juvenile birds and mammals were overcome by the storm.

But unlike humankind, nature doesn't have federal disaster assistance and private insurance to help it rebound. Nor does it need them. In many ways, nature is geared to harness its own catastrophic forces. Tropical winds, rain and fire were shaping the landscape of eastern North Carolina long before the first human laid a foot here. Far from stagnant, this resilient environment thrives on change.

Forests

The sheer volume of trees destroyed by Fran is staggering. Forest surveys show that widespread damage affected 8.2 million acres of woodland in 53 counties as the storm's strongest winds made landfall near Topsail Island and continued on a northwesterly course through the Piedmont before entering Virginia. Along the coast the storm damaged 85 percent of the trees, with the most severe destruction in Pender and New Hanover counties. The overwash of seawater caused by an 11-foot storm surge added to the coastal damage, with the salt burning trees and shrubs on barrier islands and along the forested edges of sounds. But as far inland as Raleigh, forest damage from the wind exceeded 50 percent.

Overall, 44 percent of North Carolina's commercial forests were damaged or destroyed, with timber losses estimated at $1.3 billion. Nearly 8.7 billion board feet of sawtimber and 14.5 million cords of pulpwood were destroyed.

"It's certainly the worst timber loss in this century by far," said Stan Adams, director of the state's Division of Forest Resources. "The forest will recover, but we're looking at 20 to 30 years to replace some of these trees. In many cases, that means the length of time it takes to grow a mature tree."

KEN TAYLOR

***Covering nearly** the entire state at landfall on September 5 (left), Hurricane Fran downed millions of trees from the North Carolina coast through much of the Piedmont (above).*

Adams estimates that 750,000 acres of woodland will require complete reforestation as a result of the two hurricanes. That's a momentous task, considering that the state's best tree-planting effort prior to the storm was 125,000 acres last year. To complicate matters, the threat of huge wildfires fueled by all the downed trees is a very real concern.

Adams expects the elevated fire threat to last at least 10 years. In developing a long-term recovery and fire protection plan, he called on government and private forestry leaders from South Carolina with experience from Hurricane Hugo for advice. The North Carolina plan, filed in December, requests $78 million in federal aid for

KEN TAYLOR

KEN TAYLOR

Hurricane Fran's *hellish winds scattered trees in eastern forests like so many toothpicks including those in this tract at Clemmons Educational State Forest in Johnston County (above). About 8.2 million acres of woodland in 53 counties were damaged or destroyed. But some native tree species like these longleaf pines (right) on Holly Shelter Game Land in Pender County held up surprisingly well thanks to the support of a long tap root. Many trees species native to the Coastal Plain have evolved over thousands of years to withstand the force of hurricanes.*

additional manpower and management assistance to replant the damaged forests and protect them from fire.

One blow to the reforestation effort was Fran's timing. "The problem we had was the storm hit before the pine seeds were mature," Adams said. "Had the storm come a month later, we would have expected a tremendous amount of natural regeneration." Instead, immature pine cones were blown off their trees or broken away with downed limbs. Similarly, hard mast was removed six weeks prematurely, and most acorns began rotting right away.

At Bladen Lakes State Forest, foresters were able to salvage 3,000 bushels of longleaf pine cones from the orchard grounds and place them in cold storage to protect the seed. About 50 percent of the seed should be viable. Foresters were also able to salvage longleaf cones from Sandhills Game Land, and they plan to get additional loblolly and longleaf pine seedlings from South Carolina and Virginia.

Adaptations to wind, rain and fire over thousands of years show why the longleaf pine dominated the Coastal Plain until the past 100 years, when humans replaced it with the faster-growing loblolly species. On Holly Shelter Game Land, which was directly assaulted by both Bertha and Fran, longleaf pines held

WILLIAM S. LEA

***Hurricane winds** dealt a serious blow to endangered red-cockaded woodpeckers and other mature forest dwellers. Biologist David Allen (right) installs an artificial nesting cavity to replace a natural one destroyed by Fran. Other wildlife species including bears can take advantage of the newly created habitat.*

Storm Victims

No animal species was harder hit by the 1996 hurricanes than the red-cockaded woodpecker. Hurricane winds had an easy time breaking these endangered birds' nesting trees off right at the cavities. The cavities, which take the tiny woodpeckers months or years to build in mature pines, proved to be a natural weak spot for the wind to exploit. Many woodpecker cavity trees on both the Croatan National Forest and Holly Shelter Game Land were destroyed by Hurricane Fran. At Holly Shelter, which took the brunt of the wind, 53 percent of the active cavity trees were snapped off or uprooted.

That deals a devastating blow to isolated woodpecker colonies already on the ropes. In some areas, only a single breeding pair has survived. And with few large pines now left, hurricanes and other wind storms pose a real threat to the species.

"Immigration from other areas can replace most damaged systems," said David Allen, the Wildlife Commission's nongame coastal project leader. "But isolated populations like these that can't be restored are simply lost."

Luckily, Allen's experience with Hurricane Hugo while working with the U.S. Forest Service in South Carolina helped him perfect a method to provide woodpeckers with "instant" cavities after hurricanes and other major natural disasters. Hurricane Hugo's blistering 135-mph winds in 1989 destroyed nearly 90 percent of the woodpecker cavity trees on the Francis Marion National Forest in South Carolina—a major red-cockaded enclave—and killed 60 percent of the birds themselves. With few mature pines left, the remaining birds seemed doomed.

But by cutting holes into much younger pines, biologists were able to insert wooden boxes with entrance holes, which when sealed with putty serve as excellent woodpecker homes. The birds readily accepted the artificial cavities—some even took to the new cavities the day they were inserted. In the first year, more than 60 percent of the artificial cavities were in use. That number has grown, and not one artificial-cavity tree at Francis Marion has been lost to the wind.

N.C. Wildlife Commission biologists began installing the first of about 50 similar

KEN TAYLOR

insert boxes at Holly Shelter in late February to replace cavity trees broken by last year's storms. An alternate drilling method is also being used by U.S. Fish and Wildlife biologists to restore cavities on the Croatan National Forest. Both should give the birds a fighting chance at recovery.

"We envision these techniques helping the birds through hard times like hurricanes," Allen said, while taking a break from the roar of the chain saw after cutting an insert cavity 12 feet up into a longleaf pine at Holly Shelter. "Hopefully the birds can spread out, multiply and excavate natural cavities of their own."

BLANCHE C. HANING

***Record-level floodwaters** in the wake of the hurricanes flushed an onslaught of organic material from swamps, fields and towns into eastern rivers. Pollutants from large urban areas like Raleigh (above) only added to the deadly sludge that awaited fish downstream.*

their ground. But on nearby private plantations, loblolly pines were devastated.

The secret to the longleaf pine's success consists of a long tap root that holds the tree firmly in the ground and fewer lower limbs for less wind resistance than the loblolly.

Another southern coastal survivor, the bald cypress suffered little damage during the storms thanks to a sturdy base, strong root system and tiny needles. As it has for the past 1,700 years, an ancient cypress stand continues to survive along the Black River on the Pender-Bladen county line despite the pummeling of dozens of hurricanes.

Magnolias, willow oaks and live oaks also held their own for different reasons. For the two majestic oak species, small leaves provided less surface area for the wind to buffet. For magnolias, the shelter of larger trees combined with soft, springy wood and roots accustomed to wet soils made the difference.

But other species, including red and white oak, yellow poplar, red maple and sweet gum, took a real hit from the storms especially around the edges of pine stands and in river bottoms. Still, the openings in the bottomland forests will provide light for shrubs and flowering trees to flourish this spring and summer. The added light given up by the broken sweet gums will make room for magnolias, sweet bays and dogwoods.

"It's amazing how resilient this land is," Adams said. "If given time and a little help, it will recover very nicely."

Wildlife

Some Tar Heel wildlife populations took a real beating from the storms of 1996. Hardest hit were those creatures that depend on mature forests for shelter or food. Most notably, the widespread loss of mature acorn-producing oaks will hurt species like squirrels dependent on hard mast for food for years to come. Cavity-nesting birds, including wood ducks and endangered red-cockaded woodpeckers, also took a hit when their nesting trees were destroyed by the high winds (see "Storm Victims.") And as many as 90 percent of the sea turtle nests from Bogue Banks to Cape Fear were wiped out by the storm tides of Bertha and Fran.

But not all wildlife populations were harmed by the hurricanes. Biologists agree that many species will actually benefit from the habitat created by the windfall of downed timber and flooded wetlands. "The fact that trees were blown down across various woodlands will stimulate seed-producing plants, which will in turn benefit some small game, birds and deer," said Carl Betsill, manager of the N.C. Wildlife Resources Commission's Research and Regulations Section. Most early-succession-forest species, including rabbits, bobwhite quail and some songbirds, will benefit from the burst of undergrowth caused by the downed trees. The new growth mixed with a tangle of limbs and broken trees will also provide excellent shelter for other birds and small mammals.

In many ways, the storms served as random card dealers—reshuffling the deck of animal and plant species on the Coastal Plain.

Among large mammals, browsers like white-tailed deer should benefit from the greenery that sprouts up to meet the sunlight in storm-cleared forest openings. Black bear populations should also remain fairly stable. Though both species depend on acorns, they have adapted well to alternate food sources on the Coastal Plain. Coastal bears depend more heavily on soft mast, including berries, which will increase with the exposure of the forest

***Hundreds of thousands** of fish were killed by the oxygen-robbing floodwaters. But countless other fish and aquatic species survived. By the end of this year, the Wildlife Commission will have stocked more than 600,000 fish to help speed the recovery.*

BRAD HAMMERS

JAMES K. LEUMAS

***Hurricane-induced** floodwaters also knocked out dams and impoundments leaving exposed lake beds like this one in Bladen County. While some aquatic habitat was lost, downed trees and branches left by the storms in streams, rivers and lakes will create shelter for many fish.*

floor to sunlight. And countless decaying logs left by the storms will provide an ideal habitat for high-protein insect larvae, which the bears will readily dig out and eat.

Wild turkeys will have a harder time adapting to the thick undergrowth and lack of acorns in storm-ravaged areas. Long-term habitat changes will take their toll in heavily damaged areas. Since turkeys prefer open forests where they can watch for predators and make quick escapes, the thick new growth will not be used much by turkeys. But areas with only slight damage will actually help by providing nesting areas and greenery for food. The loss of hard-mast-producing trees will depress wild turkey populations for several years in the worst hit areas but shouldn't wipe them out.

Less adaptive and highly dependent on acorns and nuts, gray squirrels should decrease in numbers in the hardest hit areas for several years. As a result, populations of birds of prey including red-shouldered hawks, which feed heavily on squirrels, may also fall off. Gray squirrels should recover because they are common over a large area.

Wood ducks will find it increasingly difficult to find natural nesting cavities along the coastal bottomlands, which were hammered by the hurricanes. The mature hardwood cavity trees the ducks use to raise their young are prone to wind damage. But the widespread use of artificial nest boxes, which wood ducks readily accept, should offset some losses. And damage to countless large standing trees may actually help the birds in the long run by providing plenty of natural hollows.

The eastern fox squirrel, another inhabitant of mature forests, also took a hit. The large squirrel had already become restricted to isolated populations through the widespread loss and fragmentation of its longleaf pine habitat. The storms didn't help isolated populations, especially those living on Camp Lejeune Marine Corps Base in Onslow County. Wind and salt damage to trees wiped out much of the food supply for the fox squirrels and made for a hard winter. Though plenty of fox squirrels were living on the base before the storms, a relocation project being conducted by the Wildlife Commission turned up no nesting fox squirrels over the winter. As an encouraging sign, biologists were able to trap nesting fox squirrels at other locations farther inland.

The hurricanes' impact on songbirds was mixed. Species that favor new growth should benefit from the habitat created by the storms, while those dependent on mature forests will be hurt. But birds generally fared well after the hurricanes. "This was a short-term event for most songbirds," said Mark Johns, the Wildlife Commission's Partners in Flight coordinator. "Some birds were killed, but most either hunkered down and weathered it out or moved out of the storm's path."

The creation of extensive brush from the storms benefits wrens, sparrows and juncos. The opening of the forest floor to sunlight will also produce plenty of berries and small seeds for songbirds to eat. And damaged trees will soon become snags providing homes for various woodpeckers in the coming years. But

KEN TAYLOR

***Nowhere is a** hurricane's awesome force more evident than on a barrier island. Topsail Island took the brunt of two hurricanes in less than two months and gained a new inlet (above). Storm-driven winds and water flattened protective dunes and pushed waves of sand across the island into the salt marsh.*

cedar waxwings and bluebirds went hungry in isolated areas after Fran's winds stripped berries right off the bushes. Still, the path of destruction wasn't wide enough to destroy large populations of songbirds.

Fisheries

The year 1996 was hard on nearly all eastern North Carolina rivers from the Triangle to the coast. Record-level floodwaters in the wake of the storms killed hundreds of thousands of fish as an onslaught of oxygen-robbing organic material was flushed from swamps, fields and towns upstream.

More than 75 percent of the reported fish kills last year were directly attributed to hurricanes Fran and Bertha. The majority of the hurricane-induced kills occurred in the Neuse and Cape Fear river basins, where more than 8 inches of rain fell in a matter of days, especially far inland. Severe kills were discovered on the Northeast Cape Fear River in Duplin County, Harris Lake in Wake County and the South River in Cumberland County. And fish kills occurred throughout the Neuse drainage from Falls Lake to below New Bern. Other hurricane-related fish kills were reported in the Chowan, Pasquotank, Lumber, Tar, Pamlico, Roanoke and White Oak river basins.

The chief cause was natural—leaves and decaying debris washed from swamps severely reduced the dissolved oxygen in the rivers and streams. But the flooding of nutrient-rich farm fields and swine lagoons and the discharge of large volumes of human sewage from dozens of failed wastewater treatment plants upstream added to the kills. At least 28 fish species were represented in the kills, mainly freshwater fish, including huge catfish, sunfish, largemouth bass and eels. Blue crabs were also knocked out in widespread numbers in the lower reaches of the coastal rivers. Other animals, including turtles, were killed in small numbers.

Despite the devastation, many aquatic species survived the storms and their oxygen-robbing floodwaters. "We had some severe kills, but there are plenty of fish that survived," said Fred Harris, chief of the Wildlife Commission's Boating and Inland Fisheries division. "Fish readily move from oxygen-depleted areas and seek shelter in small creeks and other less toxic waters until the danger has passed."

Fishing guide and biologist George Beckwith witnessed the escape of thousands of fish along the lower Neuse River immediately after Fran passed. "What we saw at Oriental was a mass exodus of fish out of the Neuse River moving ahead of the dead water," Beckwith said. "We saw the fish go up the creeks and hug the shoreline to avoid the dead water." Millions of crabs were also able to escape ahead of the sludge into the estuaries of Pamlico Sound.

"This is encouraging, it shows that some fish survived," Beckwith said. But he worries

about the river farther upstream above New Bern and the aftereffects of the massive amount of man-made pollution that Fran washed into the river. "Between New Bern and Goldsboro, we had a sludge of 40 miles of water with zero oxygen," Beckwith said. "Who knows how long it will take that area to recover?"

Harris estimates that it could take four to 10 years for fish populations to rebound in the hardest-hit areas, although it may take much longer before huge fish are seen again in some places. But nature has a way of replenishing itself when numbers are low. Spring spawning and hatch rates often increase dramatically after natural disasters, in part because the number of predators has been reduced.

To help speed up the recovery, nearly 300,000 bluegill, redbreast and redear sunfish fingerlings donated by the South Carolina Department of Natural Resources were stocked in North Carolina coastal rivers over the winter. Additional stockings from the Wildlife Commission's Watha State Fish Hatchery of more than 308,000 sunfish, catfish and largemouth bass are scheduled for this year.

In the long run, the downed timber and large limbs knocked down by the hurricanes into rivers, lakes and streams may actually help fish populations increase. "This large woody material can improve fish habitat by providing a source of shelter for many different species," Harris said. And as a short-term bonus, the hurricanes helped flood temporary coastal wetlands that haven't had much water in years because of extensive land drainage for development. These saturated areas made for excellent breeding grounds through the spring for various amphibians, including Mabee's and marbled salamanders, Carolina crawfish frogs and various tree frogs.

KEN TAYLOR

***Despite their** fragile appearance, residents of a coastal marsh above and below the water can harness the destructive forces of hurricanes. Far from stagnant, this resilient environment thrives on change.*

RODNEY FOUSHEE

***Live oaks and** other stabilizing vegetation were uprooted and swept across Topsail Island by Fran's 11-foot storm surge. Given space and time, pioneer plants will take root and start rebuilding a more diverse island ecosystem.*

Ground Zero

Sometimes it takes a careful eye to spot the benefits of a natural disaster, especially in the most devastated areas.

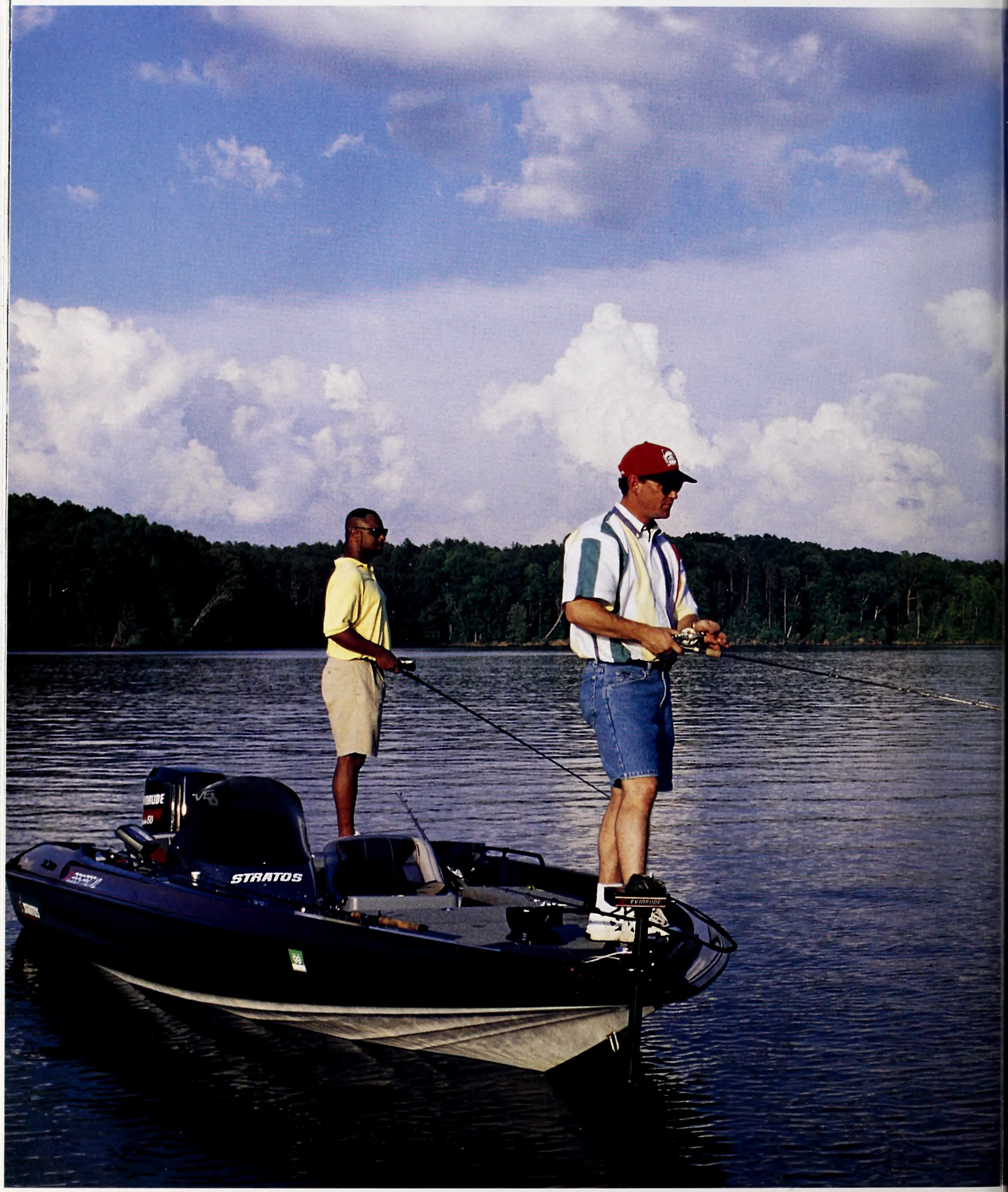
On ravaged Topsail Island, which took the full force of two hurricanes, the awesome destructive powers of wind and water are painfully clear. Nearly a year later, most of the damaged homes have been repaired or simply bulldozed and hauled away. But in many places, empty sandlots are all that remain to mark where houses once stood. Other houses, appliances and docks still remain in the salt marshes behind the island as testament to the two storms' combined fury.

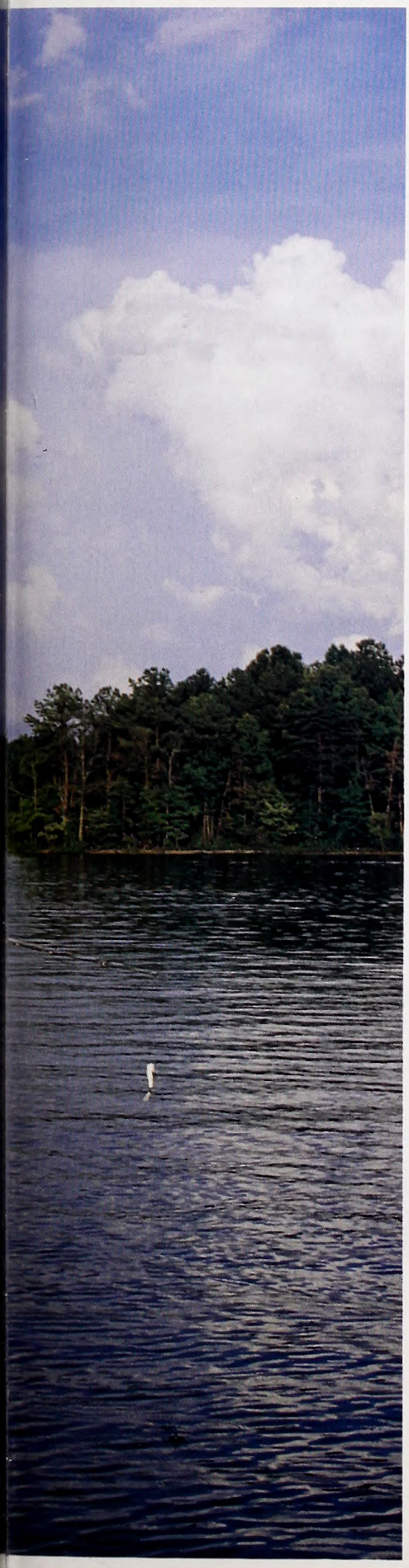
Protective dunes that were stripped from the beach by the storm surge have been replaced with a makeshift wall of sand. Sea oats, shrubs and live oaks that once held the strip of sand together have been swept to the back of the island in a mound of decaying brown and gray. Channels in the salt marsh that used to allow fresh seawater to pass have been choked off by the waves of sand that washed over the island. Entire shellfish beds have been smothered, and water flow in some areas has been reduced.

But this is only a temporary setback for nature. Decaying mud and detritus will soon fill in where the current once kept the area open and full of clams. The marsh and the island are not destroyed, they are only changed. The mud will support oysters instead of clams. And decaying woody material trapped in the bays will provide food for blue crabs and other animals, as well as small fish. Spartina grass will soon form where the channels once flowed, giving tiny fish shelter and birds nesting material.

On the barrier island, pioneer plants like wax myrtle, yaupon and juniper will soon take hold and start rebuilding a more diverse ecosystem. If given the space and time, vines and ivy will form a thicket and begin making soil for young live oaks. Give it a hundred years or so—the blink of an eye for nature—and a maritime forest could be in the making.

Far from limiting natural systems, hurricanes have helped promote the plant and animal communities of eastern North Carolina for thousands of years. By reshuffling the mix every few decades, these winds of change help provide diversity and strength to the environment. Nature will replenish itself. Just wait and see. ⊠


STRATOS
EVINRUDE



Fishing the Floaters

Catching bass on topwater lures is not only more fun, it's probably more effective than you think.

written and photographed by Gerald A. Almy ©1997

Be honest. Does crawling a plastic worm across a piece of unseen structure 40 feet below the water's surface sometimes seem a bit tedious to you? Does your mind start to roam as you try unsuccessfully to visualize what's going on way down in those murky depths? Does chucking and cranking a big-lipped diving plug over and over sometimes seem more like work than sport?

While none of us would want to abandon these types of fishing, if you sometimes find your interest lagging a bit after hours of cranking deep-burrowing plugs or slowly inching worms across the bottom, it may be time you reacquainted yourself with topwater fishing.

No thrill in angling can match the sight of your surface lure suddenly being engulfed by a bass. No other method of angling offers the intimate, second-by-second involvement of this type of fishing, nor can any other technique match the visual and auditory thrills it provides.

Every part of the angling scenario is played out before your eyes and ears. You see the strike from the second the bass rolls up to the bait and nabs it, then turns back down. You hear the soft gurgle, chugging or sputtering as the lure works across the surface, and the loud strike when the bass nails it. Often bass fooled with surface lures will also do the majority of their fighting on top after they're hooked.

I admit it. I'm hooked on surface fishing. When I'm going after trout, my nymph and streamer boxes, although well stocked, rarely get pulled from the vest. Rather, a dry fly will almost always be knotted to the end of the tippet. If I'm going after bream, I may soak a worm or cricket now and then or cast a small plastic grub. But more often than not, I'll have a sponge rubber spider on the end of a leader so I can see the colorful swirl of a bull bluegill or shellcracker grabbing the little bug from the surface film.

Likewise with bass; whenever there's the slightest chance these fish—largemouth or smallmouth—can be taken on the surface, a topwater lure will be on the end of my line. And it, or another one, will remain there until I either fool a bass or become totally convinced I have to go deeper.

Though topwater fishing is often labeled as an "occasionally effective" method of fishing, I've found that there really are surprisingly few situations where you can't fool at least a few bass into attacking a lure on the surface. The key is to try a variety of these offerings with several distinctly different retrieves. Chances are one or another will work, unless it's the dead of winter, when water temperatures hover in the 30s and 40s. When temperatures reach the 50s, a few fish can usually be lured up top. By the time the mercury readings head into the 60s and up, bass can be fooled frequently with one or another kind of surface offering.

Before going further, it might help to clarify what exactly is meant by topwater fishing. Basically the term means fishing with lures that float and either stay on the surface or occasionally dart beneath it a few inches. Topwater lures imitate natural bass foods such as dying minnows, shad, cicadas, grasshoppers, dragonflies, tadpoles, frogs, mice, birds, baby squirrels, small muskrats and snakes.

Here are six major types of topwaters and tactics that have produced for me in North Carolina, and in other states from Texas to New York.

Stickbaits—These are among the most subtle surface lures, and they do, in fact, look like a stick whittled to a point on each

***Topwater lures** have long been favorites when fishing shallow shorelines or flats in small lakes and ponds. However, more anglers are using surface lures in large impoundments for school bass over deep, open water.*

end. Good fishermen can make these lures come alive on the water.

Stickbaits don't have a cupped head to make them chug, propellers to kick up spray, or a lip to make them dive. The angler provides all the action. The most famous model is the Heddon Zara Spook, invented in Pensacola, Florida, in 1922. Originally it was called the Zaragossa, because it had a wiggle "like the girls down on Zaragossa Street," a red-light district in Pensacola at the time. The lure was redesigned in plastic and named the Zara Spook in 1939. Other popular stickbaits include the Bagley Tall Walker, Rebel Jumpin' Minnow, Storm Thundermac, Arbogast Phred's Phydeaux and Poe's Jackpot.

The first technique I try with these lures is the subtle twitch. Since there's no propeller,

***There are lots** of lures designed to be fished on the surface, but these are some of the basic types. From top to bottom: buzz-bait, wobbler (Jitterbug), darting lure (Zara Spook), popper or chugger, prop-bait, floating-diving minnow.*

you can work them very quietly, and that's often the key to drawing strikes in shallow, clear or hard-pressured waters. Gently pull on the rod tip until the lure shudders, then wait. Twitch again. Then wait.

If this doesn't produce, try the most famous retrieve of all for this lure—"walking the dog." Pull the plug with sharp jerks of the rod so it moves from one side to the other, giving slack line between pulls. It takes a bit of practice, but soon enough you'll get the knack for this technique and be able to work the lure back in a rhythmic pumping motion that often draws savage strikes. The lure rolls on one side and then the other, like a shad in its death throes. If these retrieves don't score, try steady reeling to simulate a slithering snake or fast pumping to imitate a mouse.

Thin-minnow plugs—These lures are among my favorites and include models such as the Rapala, Thunderstick, Rebel, Red Fin, Bang-O-Lure, Sea-Bea and Long A. All of them float on the surface at rest but dive a few inches to a few feet when jerked or steadily retrieved. If you simply cast them out and crank them back at a moderate to fast clip, you'll catch fish, but they can't be considered topwater lures when used like that.

Instead, I like to fish them in one of three ways on top. The first is to simply twitch the lure lightly, so it moves forward very little. This is best when you are working a specific piece of structure such as a log, a rock outcropping or the edge of lily pads. That helpless struggling is often too much for a bronzeback or largemouth to take, and smashing strikes are common. Let the ripples settle after the cast, then work the lure with twitches and pauses for as long as your patience will allow. Then recast to another likely area.

The second approach I use is a modification of this one, with more violent jerks of the rod—1 to 3 feet at a time. This causes the lure to lurch under a foot or more, then bob up. It's particularly useful if the bass are spread out a bit more.

A final surface retrieve that I like with the slim minnows is V-waking the plug back. Reel ever so slowly, but steadily, and the lure will not dive under but rather wiggle seductively and make a V-wake on the surface. This looks like a very sick minnow, one that could easily be caught by a bass. It also mimics the wedgelike impression that a school of shad makes as it creases the surface of a lake. (This fact also makes it a deadly retrieve for stripers.)

Propeller lures—Shaped much like stickbaits, these lures have metal propellers at one or both ends that whirl when they are twitched or retrieved, creating extra commotion. That added splash is particularly valuable on windy days, since it makes it easier for bass to find the plug, even if the water is choppy. Popular propeller lures include the Devil's Horse, Injured Minnow, Nip-I-Didee, Torpedo, Boy Howdy, Spinstick, Ace-in-the-Hole, Dalton Special, Dying Flutter, and MirrOlure 5M and 21M.

When you cast one of these lures, try to keep the bait on a low plane over the water, so it lands quietly. After the lure hits, let the waves disappear. Then twitch it several times, with pauses in between. After a few twitches, use a rhythmic, pumping retrieve. Most strikes come soon after the lure begins moving away from the cover, but occasionally a bass will nab these lures right at boatside. Smaller versions of propeller lures such as the Tiny Torpedo are deadly on river smallmouths. Work them in the tailouts of deep pools, rocky runs and back eddies. Try slow and moderate retrieves, both steady and erratic.

Chuggers—These lures are fun to fish because they're easy to work and make a racket. Also known as poppers, they include such models as the Rebel Pop-R, Storm Chug Bug, Arbogast Hula Popper, Lucky 13, Pop'n' B2, Bass Oreno, P.J. Pop, Pico Pop and Poe's Blurpee. They imitate frogs, mice, large insects, wounded minnows and shad very effectively.

If there's a chop on the water, these are excellent choices, but they also work well in calm weather, particularly at dusk and dawn or when it's overcast. You can vary the loudness of the retrieve by how strongly you jerk the rod. The main thing with this and any other topwater is not to get stuck in a rut. Be creative. Try the slowest retrieve you can force yourself to use and also fast, . pumping motions. The fish will let you know which they prefer.

For trophy smallmouths, try jerking these plugs violently forward 3 to 5 feet at a time, then pausing. The lure races forward frantically, then slowly floats up to the top as you reel in slack line and prepare for the next sweep. This retrieve is tiring but has produced some super smallmouths for me over the years. A more common presentation is to work the lure with 6- to 18-inch jerks and pauses. These lures can draw fish up from 10-foot depths because of the commotion they make. If a fish strikes but misses, let the lure sit motionless. Chances are the fish will come back and nail it cleanly the second time.

Wobblers—The most famous wobbler ever made is the Jitterbug, a legendary fishing lure that Fred Arbogast of Akron, Ohio, introduced in 1938. The Crazy Crawler is another well-known example of a wobbler. Most feature a large, wide lip at the front or extended wings that make them wiggle or waddle across the surface, kicking up spray and creating a mesmerizing, gurgling sound. They can draw fish out of hard-to-reach cover, and they're also excellent for fishing after dark.

Unlike many surface lures, these work best with a steady, medium-speed retrieve. A slow, stop-and-go presentation is also effective.

Sonny Gregory, a guide on Back Bay—Virginia's extension of Currituck Sound—told me he had one client who booked a solid week's fishing with him every year during this body of water's heyday. The customer didn't tie on anything but a black Jitterbug for the entire trip—and he caught

***Even smallmouth** bass in rivers love topwater lures, although surface lures usually work best when fished in the quieter runs and pools. The author caught this fine bronzeback on a Heddon Torpedo.*

more than his share of bass.

For smallmouths in rivers I like the 2-inch Jitterbug. For bigmouths in lakes I go with the next two larger sizes. Some people even like to use the muskie-sized version for night fishing for jumbo bass and rig the two side treble so they fold up on top of the lure with a rubber band. I've had particularly good luck with wobblers on farm ponds and on lakes with lots of lily pads or flooded timber.

Buzzbaits—Buzzbaits have been around for more than half a century. The new modern versions are especially good for largemouths. Buzzbaits look something like spinnerbaits but feature an oversize propeller that revolves when the lure is retrieved on top. Start working these lures as soon as they touch down, so the bait will stay on the surface and kick up a fuss immediately upon entering the water. They don't look too realistic, so you don't want the fish to get a long look at them.

With the racket they make, it's clear these lures aren't designed to catch skittish, spooky fish. Rather, they're at their best when bass are feeding aggressively and prone to strike instinctively when any loud, surface-thrashing intruder rips over their lair. Models include the Lunker Lure, Bagley Buzz Fuster, Eppinger Buzz 'N Devle, Luhr-Jensen Herb's Dilly and Roland Martin Double Buzzer. A new buzzbait from Mister Twister, the Top Prop, features a hollow body that allows it to float. This broadens the retrieve possibilities, since you can let the lure rest or twitch it slowly as it works near attractive cover.

Buzzbaits are virtually snagless, so they're terrific for working right through nearly any type of cover, including weeds, grass flats, tangles of stickups, blowdowns and wood cover that would snag most traditional surface lures. The steady retrieve that works best also allows you to cover lots of water, searching for active, feeding fish. Strikes on buzzbaits can be explosive, so be ready for your heart to skip a beat or two when a hungry bass wallops one of these things.

Where to cast these topwater lures depends on where you're fishing. When going after river smallmouths, just about any bass is within striking range of a surface lure, since few spots are deeper than 8 or 10 feet. Often during summer the biggest bronze bass will be holed up in the heads and tails of pools, near ledges, riffles, shaded shorelines and eddies.

For largemouth bass in lakes and tidal rivers you will want to probe points, creek mouths, logjams, docks, duck blinds, drop-offs, the edges of weed beds, brush piles, stump fields, flooded willow, cypress and gum trees, and riprap near roads. As a general rule, any structure found in water 10 feet deep or less is worth trying.

One exception to this rule, though, is when you find schooling bass. Watch for churning water or birds dipping down over deep water in the main lake or the mouths of coves during hot days in the summer and fall. If you get there fast and throw a surface lure into the melee, you may find yourself rewarded with a jarring strike from a shad-eating largemouth.

Black bass don't make as much commotion on top as stripers do, but by being alert, you can often find small pods of these fish crashing bait on the surface in the middle of a 90-degree summer day. Throw a topwater plug into the swirling water, and a strike is almost guaranteed. ⊠

The Last Turpentiner

R.W. LANEY

Aubrey Shaw may have been the last North Carolinian to tap the longleaf pines for those products so closely connected to our "Tar Heel" heritage and identity—tar, pitch, rosin and turpentine.

written by Lawrence S. Earley
illustrated by Kimberly K.C. Schott

He wasn't too difficult to find. He was an ex-high school teacher who showed school kids and Boy Scouts how the turpentiners tapped trees and collected the raw gum. One day, a week or so after contacting him by telephone, I drove east out of Raleigh to meet the last turpentiner in North Carolina.

Aubrey Shaw lived in Roseboro, where he was a biology teacher for 26 years. Not far from Roseboro is the Lake Creek community, where Shaw owned about 400 acres of land, all that was left of family property that once amounted to several thousand acres, much of it in longleaf pine. There is little longleaf left here now, and most of that Shaw planted about 50 years ago. He had built a little tin-roofed cabin on his land, with curved, heart-cedar porch rails. He called his retreat Teaberry Ridge.

After crossing Sampson County, from the interstate I turned onto a two-lane country road that parallels the South River not far away. The river rises near the town of Benson and runs southeast, joining the Black River somewhere below the decrepit former railroad town of Ivanhoe. The tannin-stained waters of the Black flow placidly across the gently sloping Coastal Plain and join the Cape Fear River about 14 miles above Wilmington. Teaberry Ridge stands in eastern Bladen County, its front railing facing the South River and its back door open to the Cape Fear. This used to be the heart of the American turpentine industry. From about 1740 to 1870 North Carolina led the nation in the making of tar and turpentine, and in the 1840s, briefly, Bladen County was the center of American production.

I was a little early, and by the time Shaw

N.C. WILD STORE

WINTER/SPRING
CATALOG 1997

A catalog of publications and videos on North Carolina's great outdoors.

NEW! CAPS & TEES

NEW! CAPS & TEES

Delight your friends and family with our premium quality caps and T-shirts. White, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort, and the original designs are sure to turn heads. Three cap styles and color combinations give every cap fancier a choice.

- **N.C. WILD T-SHIRT**
  Pocketless tee has N.C. WILD logo on the front and features "All Things Are Connected" art on the back. **$14.50.**
  ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

- **WILDLIFE IN NORTH CAROLINA T-SHIRT**
  Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**
  ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

- **N.C. WILD CAP**
  N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**
  ITEM CODE **A1**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/stone. **$16.50.**
  ITEM CODE **A2**

- **WILDLIFE IN NORTH CAROLINA CAP**
  Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**
  ITEM CODE **A3**

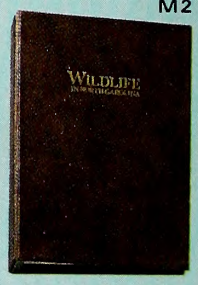
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

Wildlife in North Carolina Magazine

See our easy-order subscription form on back!

- **Wildlife in North Carolina Magazine**
  Excellent color photography and great articles on hunting, fishing, natural areas, wildlife research and our environment. One year, 12 issues **$7.50.** Three years, 36 issues **$20.** Lifetime **$100.**

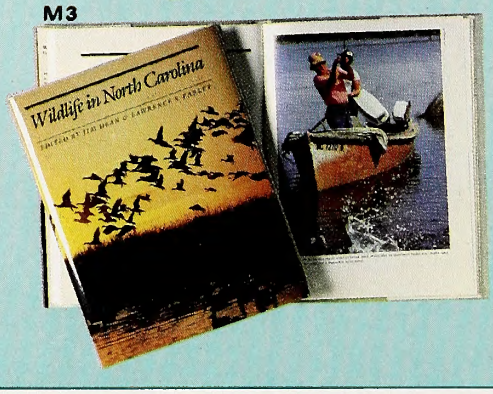
M2



- **Dogs that Point, Fish that Bite**
  "Jim Dean brings you his outdoors with long experience, pleasant sentiment and unforgettable wry humor." –Charles F. Waterman, author of *Black Bass and the Fly Rod*
  Here are fifty of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**
  ITEM CODE **M8**

M8

M3



- **Wildlife in North Carolina Book**
  The best of *Wildlife in North Carolina* magazine. **$12.**
  ITEM CODE **M3**

- **Wildlife in North Carolina Magazine Binder**
  Store 12 issues in this sturdy binder. **$10.**
  ITEM CODE **M2**

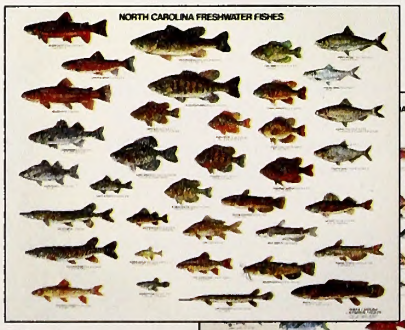
- **N.C. WILD Notebook 1995-1996**
  Eight issues of North Carolina WILD Notebook, the Wildlife Commission's prize-winning conservation-education newsletter. **$3.**
  ITEM CODE **E11**

E11

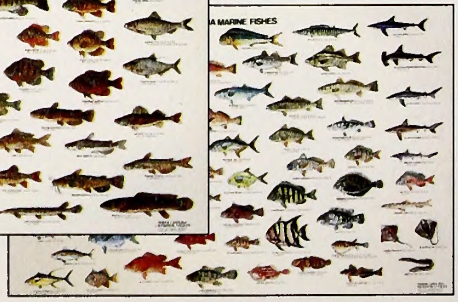
- **N.C. Freshwater Fishes**
  Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". **$6.**
  ITEM CODE **P6**

- **N.C. Marine Fishes**
  All the colors of the sea can be found on this color poster showing 60 marine fishes. 35" x 22½". **$6.**
  ITEM CODE **P7**

- **N.C. Freshwater Fishes and N.C. Marine Fishes**
  Save $2 when you buy both posters as a set. **$10.**
  ITEM CODE **P9**

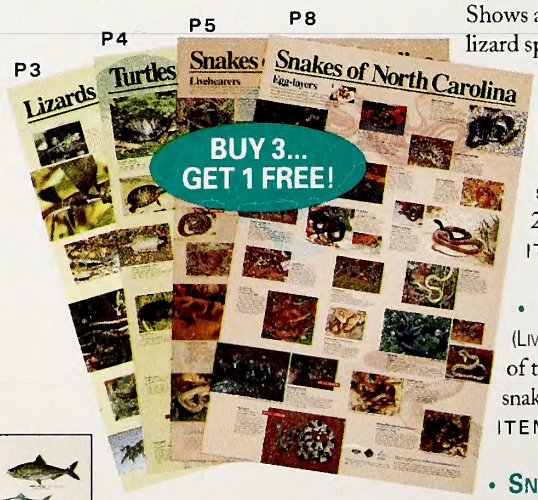


P6



P7

P3 P4 P5 P8



- **Lizards of N.C.**
  Shows all 12 of the state's lizard species. 22" x 34". **$6.**
  ITEM CODE **P3**

- **Turtles of N.C.**
  Shows all 21 of the state's turtle species. 22" x 34". **$6.**
  ITEM CODE **P4**

- **Snakes of N.C.**
  (Livebearers) Shows all 17 of the state's livebearing snake species. 22" x 34". **$6.**
  ITEM CODE **P5**

- **Snakes of N.C.**
  (Egglayers) Shows all 19 of the state's egg-laying snake species. 22" x 34". **$6.**
  ITEM CODE **P8**

- **Set of 4 Posters**
  You'll save $6 by purchasing the set of four posters above. **$18.**
  ITEM CODE **P10**

MAGAZINE SUBSCRIPTIONS

WS97

☐ RENEW or ☐ ENTER my subscription.
(If renewal, attach recent magazine label.)
( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
area code

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Mr./Ms./Mrs. _____ ___ _____
first name MI last name

Mailing Address _____

City _____ State ___ Zip _____ - _____

MAGAZINE GIFT SUBSCRIPTIONS

WS97

Gift Subscription To _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

( ) 1 year $7.50 ( ) 3 years $20 ( ) Lifetime $100

Gift Subscription From _____

Mailing Address _____

City _____ State ___ Zip _____ - _____

____ Magazine/gift subscriptions **TOTAL**

EDUCATIONAL MATERIALS

WS97

Name _____ Home phone (___ ___) ___ ___ - ___ ___ ___ ___
area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____ - _____

Quantity	*Item code*	*Item name*	*Price*	*Total*

☐ Charge my MasterCard or VISA for the magazine subscription order below. My card number is _____

and the expiration date is _____ / _____.

_____ ( )
Card holder signature Day Time Phone Number

Educational materials **SUBTOTAL** $

Discount (subtract 15% discount for **retail** orders of $100 or more) $

Sales tax *(N.C. residents add 6% sales tax)* $

Educational materials **TOTAL** $

Enter grand total here if ordering **both** magazine subscriptions and educational materials. (Fill out both forms above.) **TOTAL** $

Make checks payable to: *N.C. Wildlife Resources Commission. Send your order in the envelope provided. All orders must be prepaid. We do not bill. Please do not send cash. Please allow 6-8 weeks for delivery on all magazine subscriptions, 4 weeks for educational materials. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Educational materials may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.*

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS...

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

	PRICE
☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands)	$250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine	$100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths. Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: ( ) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

WFWS97

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

♻ *Printed on recycled paper*

N.C. Wildlife Endowment Fund

drove up in his pickup truck, I had already inspected his cabin, which was standing with its doors ajar. He climbed out and greeted me cheerily. He was 74 years old, an age he shared with the oldest longleaf pine trees on his land, he told me. On the unseasonably warm January day he was dressed in jeans, a plaid shirt with purple, cranberry and gray colors, and a blue ball cap with no insignia. His hair was gray beneath his hat, and bushy tufts of dark hair grew out of his ears. His hands are huge, I thought, as we shook hands. He was chewing tobacco, which surprised me, given his schoolteacher background. Throughout the day he chewed and spat frequently. Sometimes a little curl of brown juice would run down his chin. The only time he didn't chew was when he ate his lunch, a large piece of cheddar cheese washed down with a grape soda.

He said he was expecting his son, and while we waited, we talked on the cabin porch. Before Shaw died in 1995, Teaberry Ridge was an outpost for naturalists who prowled the woods and bottomlands looking for biological curiosities. Shaw had generously opened his property to anyone interested in the things he was interested in, whether it was salamanders or Venus's-flytraps, turpentining or Native Americans of the presettlement era. He had a remarkable way of bringing history alive. Once as we talked about the arrow points he had found on a nearby plot, he said, "This is where these people lived. There were children, a mom and pa."

Turpentine distillery circa 1890

Shaw was especially fond of talking about the history of his family on the land. He said that his family had been on this land since the 1700s. He was a seventh-generation North Carolinian. "My great-grandfather was George Washington Bannerman," he said "I would say he owned a couple of thousand acres of land, and a lot of that was in longleaf pine. He was in turpentine heavy until about 1900. But the trees are gone. I know where they were, and there's not but just a handful of longleaf pine on it now. That gives you an idea of what there used to be here. Sherman burned the old family house down during the Civil War, but my great-uncle rebuilt it on another spot. My great-granddaddy was a chaplain in the Civil War. I remember him just a little bit. I could have gotten a whole bunch of data from him."

He used the word "data" several times that day to mean information. He was curious about the old ways, especially about turpentining and tar making, and wished better records had been kept. "Those people back then didn't keep the data," he said.

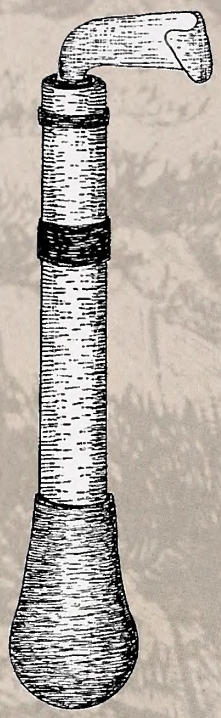
I asked him how he had gotten interested in longleaf pine and naval stores. "I reckon it's best to put it like this," he said. "I grew up here and it's just inherited. It's something I'm close to." He spat onto the ground, and we listened to the sounds of hunting dogs yelping in the distance. "The older I get, the more I see the value of history. I didn't think about it at all for a long time. I do just enough to keep the old art living. Everyone else has passed away." Scott Shaw drove up then, a stocky man in his thirties. "What do you want to do?" he asked his father. Shaw turned to me. "What do you want to do?"

"Let's go turpentining," I said.

The three of us drove the two trucks along a sandy woodland path. As Aubrey and I talked, I noticed him grimacing and squirming. "It's the shingles," he explained.

LAWRENCE S EARLEY

***This contemporary** turpentined pine tree in Georgia shows how the gummy resin oozes from the cuts and drops into the oblong cup below. Fresh resin is colorless, but once exposed to the sun it turns white. Resin collected from the first year of a tree's working was once called "virgin dip" and made the most valuable grades of turpentine and rosin.*



Turpentine hack

Dipping paddle

Boxing axe

He was getting over it, but he still had a lot of pain. Once during the day he reached for a bottle of pills on the door and popped one into his mouth, washing it down with a gulp of water out of a half-gallon jug. We stopped at a shed not far from his demonstration area. While Scott pulled some tools and a turpentine bucket out of the shed and loaded them into the bed of his truck, Aubrey showed me two chunks of sawn pine about 2 inches square. One was a piece of longleaf pine sapwood, and the other was the heartwood. The heartwood felt dense and heavy, like hefting a piece of metal. Then he showed me three pieces of gnarled, knotty wood. I thought they were rotten until I lifted one.

"That's what's called 'lighterd' or 'fat lightwood,'" he said. He explained that lightwood is what is left of the heartwood of old trees after they die. In the original forest, settlers found lightwood from branches and dead trees littering the forest floor. "With these dry bones the surface is very much covered—not entirely covered, but so thick as to fill the body of a horse-cart, in many places, in a square of ten yards, and every so often in a square of ten feet," wrote one 19th-century observer. The settlers gathered the flammable lightwood and used it for torches or to make tar. "In the forests of today," Shaw said, "you don't find lightwood, because the trees are normally cut before they grow old enough to form it."

We got back in the trucks and drove on for a few more minutes before stopping beside a tract of longleaf pines that had been burned recently. Off the forest path, a huge stump carried a plaque that read: "I am or was a longleaf pine tree, born in about 1400, and I grew up one quarter mile west of here. I was chopped down with an axe about 1810 by a left-handed man when I was 410 years old. Indians were my neighbors for about 100 years before the first of you folks came over."

Shaw worked four of the pines for turpentine. Two of them had a single clay cup with two tin gutters hanging from them about knee high, and two others had been "boxed." Using a boxing axe, Aubrey had cut a pocket about 4 inches deep and 8 inches wide into the living tree. The cups and boxes collected the gum that flowed out of a series of angled cuts, or "streaks," about 8 inches long and ¾ inch wide that he had "chipped" into the tree. The "face," or the chipped area, head high and about a foot wide, was covered with the white, sticky gum. Scott removed a wooden bucket and a tool from the rear of his truck. After demonstrating the chipping process, he handed me the tool which he called a "hack." The hack was surprisingly heavy. At one end of a foot-long wooden shaft was a heavy metal weight. At the business end a curved, U-shaped piece of metal was attached. I hesitantly scratched through the bark and the metal bit into the white wood underneath. I was surprised at how easily it cut through the bark, and into the wood. Not that it was effortless. I had to put some weight into it, but the weight of the tool and its sharpened edge helped me cut cleanly. I angled my cut down toward the point of the V as Scott had done and then tried the other side of the V. That one seemed to go a bit better. I walked to another tree and tried it again. Clear liquid drops had appeared almost immediately after I gouged the wood. I watched them as they grew larger, and I finally drew my finger across one. The gum was sticky and hard to remove.

Turpentine orchard circa 1920s

"Yeah, it's nice and warm today, so that gum comes out pretty fast," said Aubrey. "Why don't you try dipping some."

He handed me a dipper, a tool with a 2-foot-long wooden shaft and broad, flat-bladed metal end shaped like a broad spear point. I brought the bucket over to one of the boxed trees and tried to remove the gum. The quicker a turpentiner removed the gum after it collected, the less evaporation and discoloration occurred and the better quality and more valuable gum he'd have at the distillery. I tried to work the old gum into the

bucket but gave up. This gum had been in the box so long it had nearly congealed. Shaw explained that he hadn't been out there in a while and had let the gum sit for a few months. While he removed one of the cups and used a stick to prod the slightly runnier gum into the bucket, I did some quick mental arithmetic. If each box held a quart, and it was emptied generally about five or six times a season, that meant that each turpentined tree might be bled of about a gallon and a half of resin each year. Of course, trees varied notoriously in their gum production, with some trees heavy producers while others were practically dry.

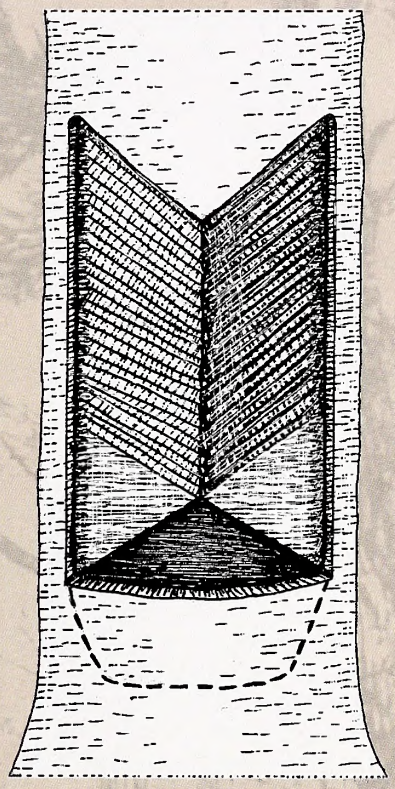
The turpentine season in North Carolina ran from March until early November, although a big turpentine operation could keep men busy nearly year-round. In winter, after the tree had gone dormant, some men were employed cutting the boxes. Then, beginning in March, chippers would make fresh cuts into the tree every week to make the gum run, and dippers would collect the gum five to eight times a season. Boxing was so destructive to the tree and wasted so much turpentine that for decades men looked for alternatives, but it wasn't until the clay "Herty" cup was developed by chemist Charles Herty in 1903 that the boxing method gradually was eliminated. Instead of digging a container into the tree, the cup could be hung on the tree with nails. Every year or two, the cup could be moved higher to be closer to the running gum, thus allowing more of the gum to be collected.

The gum, or resin, that exudes from the tree's cut is not its sap. Gum, or resin, is a different substance altogether. For thousands of years, people have been scratching trees and cooking plants to capture a variety of gums, resins and volatile oils useful in the making of perfumes, unguents, waterproofing materials, medicines, embalming agents, illuminants, incenses and other valuable products. Legendary gums include the frankincense and myrrh carried by the Three Kings of the East. Other gums include the latex that exudes from the Pará rubber tree in the tropical forests of Brazil. Rubber tappers make incisions in the tree that cause a milky fluid to flow. It is gathered in cups and eventually pressed into sheets.

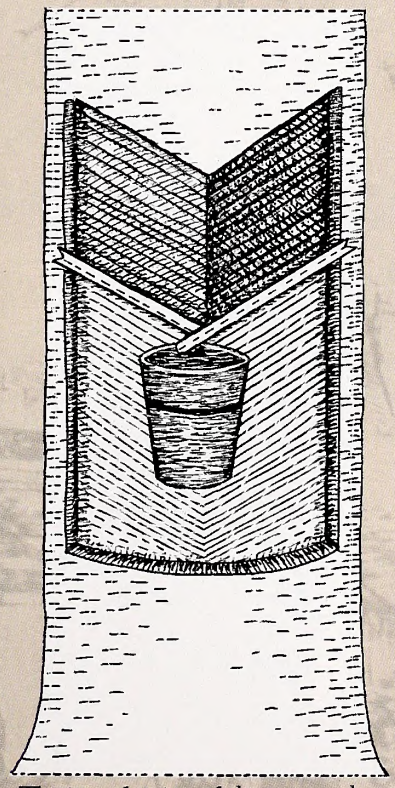
Resin's main function is to protect the tree. When a pine tree is wounded, the gum is stimulated to flow to the wound and cover it, protecting it from insect invasion. When I chipped through the bark of the tree and into the wood, I sliced off the ends of the resin-carrying ducts. The dewlike globes of sticky liquid that I saw were the resin flowing out onto the scraped wood. Eventually the gum hardens as the volatile elements evaporate, which is why the chipper must return each week to cut another streak and

***The turpentine distillery** was a common sight in the longleaf pine forests of the 19th century. Barrels of raw gum collected from the trees were carted to the still and converted to turpentine and rosin. Once the lightweight copper "still" was introduced, the entire building could be fairly easily disassembled and reassembled elsewhere, contributing greatly to the migratory character of the turpentiners.*

LAWRENCE S. EARLEY



***This turpentined** "face" shows the older, more destructive style of boxing. Workers cut a deep pocket or "box" into the living tree to capture the gum.*



***The introduction of** clay cups and tin gutters conserved the trees and improved yield. The cup and gutters could be raised each year or two.*

stimulate a fresh discharge. The resin flows better during warm weather.

The oleoresin of the longleaf pine tree consists of resin and an "essential oil." Both of these products are valuable and are separated during the distillation process into the liquid turpentine (sometimes called spirits of turpentine) and rosin, a liquid at first that hardens into a solid. The oil is volatile, meaning that it is easily vaporized. On a hot day it's the resin transpiring through pine needles that is most responsible for the fresh fragrance, the characteristic aroma of a pine forest. This fragrance has no known natural use, but it is responsible for the ancient attraction of pine forests.

We gathered the tools and packed up the truck and drove to one of the tar kilns Shaw had excavated. The day was warming, into the sixties, and I had long since shucked the coat that I had worn. The tar kiln was about 20 feet long, rectangular-shaped and sloping toward one end. It was covered with oak leaves and pine straw, and we brushed off the debris to uncover the charred wood remains and the blackened bed of the kiln. Its rectangular shape was unfamiliar to me. Most of the tar kilns I had seen and read about had been round. The rectangular kiln that Shaw had found on his property was a "gopher" tar kiln, according to his neighbor, Tommy Johnson. Johnson had described how people used to make tar kilns, and Shaw had sketched the different stages of the process in 10 separate drawings covering three sides of 8½-inch-by-11-inch sheets of paper. The sketches, dated July 3, 1994, were kept in a business-sized envelope. In step 5, instead of sketching the kiln as he had in the previous steps, he had written: "Placing the lightwood in kiln. Refer to No. 4 diagram—(am tired of drawing)."

The gopher kiln worked pretty much the same as a round kiln. The lightwood was piled on top of green pine branches that lined the bottom of the bed. The kiln was built higher at the shallow end and covered with a blanket of straw and sod. The fire, ignited at the shallow end, gradually worked its way back to the deep end, aided by the tar burners. The slope of the bed carried the hot tar to the bottom end, where a pipe carried it to a barrel in a hole not far away. The tar itself, a thick black substance, was basically the resin of the tree, along with a mixture of hydrocarbons, alcohols and other compounds.

The tar burners forced burning lightwood through an opening on top of the kiln until the fire blazed and then dampened it by covering or partly covering the opening. The trick was to get the wood to burn slowly so that the tar was sweated out of it. It was a ticklish business. If the burners let too much air into the stack, the tar could be burned; too little air could cause an explosion, killing or scalding the tar burners. Tending the kiln day and night for a week or even more, tar burners seemed especially sinister to travelers of the day. "So dense [was the forest]... that it seemed as if we had entered a realm of sighing and moaning," wrote one visitor near the Cape Fear River in 1853. "The somber appearance which is given to the country by its extensive pine forests is by no means cheered by the tar kilns which meet the eye here and there as you pass...and which resemble burning volcanoes on a small scale...surrounded by an unearthly set of black figures in human shape, thrusting long pikes into the agonizing structure."

The tar began to run on the second day. A kiln 30 feet in diameter required about 180 cords of wood and produced about the same number of barrels of tar. This was an enormous use of wood. Historian Timothy Silver calculates that North Carolina's total exports of tar and pitch in a single year, 1753, required 75,000 cords of wood, or a stack of wood 4 feet high, 4 feet wide and 113 miles long!

"Look here," Shaw said. "The bottom of this kiln is hard as a brick. I would think that they would use this kiln over and over, don't you? Once you built one, you kept it. You know, you couldn't just put a tar kiln anywhere. You'd have to dig down to the hardpan layer. If you dug one on sandy soil, you'd lose a lot of tar. You didn't want to blaze it. Just sweat it. If you got air in here, it'd be like a bomb. I've looked at these all my life, and I used to think, well, you know, you just dig a hole. No sir. They knew what they were doing. It was a skill. I'm just beginning to learn that."

Back at his cabin, Aubrey pulled out

LAWRENCE S. EARLEY

***Workers at a** distillery charged the still by pouring the gum into a vat and sealing it with a copper cap. Cooked over a wood fire, the gum was vaporized and then cooled and converted to a mix of water and turpentine. Here interpretors at the Georgia Agrirama stir the rosin left in the vat before discharging it for barreling.*

another business envelope with a sheet of paper folded in thirds. At the top of the page he had printed in a neat hand:

As told by Ernest Bannerman
As things were 1930
Bladen County—Lake Creek Community—
"Tarkull"—Tar Kiln

Ernest Bannerman was another neighbor who had given him a lot of data about how tar and turpentine were made. After this was the following "recipe."

To make and burn a kill.
No. People—2
To dig—2 days
Lightwood—40 cart loads—12 days to cut & haul
To cover—1 day
To burn—7 days
Tar produced—12 50 gal. barrels
Hauling—50 cents/bbl.
Rent for lightwood—?
Earnings—Per man. About $1.25 / day.

Shaw has also found several round tar kilns on his property. In fact, he said there were scores of kilns all over the woods, evidence of how important tar was to the economy. And for good reason. Because wooden ships were exposed to corrosive salt air and salt water for months and sometimes years at a time, their ropes, or cordage, were treated with tar to preserve them. Hemp had no natural oils and therefore needed tar's protection. A ship had miles of ropes aboard, of many different diameters ranging from ¼ inch to 8 inches or more, depending on the size of the ship. Some belonged to running rigging, or the movable ropes that operated the sails. Others were part of the standing rigging, the heavier, permanently attached ropes that kept the masts in place. Hawsers moored the ship; massive cables raised and lowered the anchors. All of them were tarred, and most of them were tarred "in the yarn," meaning that the individual yarns were given a thin coating of tar before they were fashioned into rope. But once the ropes making up the standing rigging were actually in place on the ship, the riggers went to work tarring them again. They frequently tarred them while at sea.

I asked Shaw what people did with the tar they collected. He told me that in the old days they carted barrels of tar to the Black River, where they were boated down to Wilmington. When he was a boy, he said, they still sold it. "People would use a little of it to make pitch," he said. "You'd take the raw tar and boil it some more and it got more sticky, more compact. That would be pitch. We'd use it for patching boats, and after castrating hogs, you'd swab some tar on them."

Turpentine and rosin were loaded in barrels aboard ships, mostly for mixing paints and varnishes, although the ship's surgeon also had a quantity of "Oleum Therebinth," or spirits of turpentine, among the epsom salts, liniments, paregoric, emetics, tourniquets, syringes, splints, amputating and trepanning instruments, and other medical supplies that were loaded before each voyage. By the early 19th century, new industrial uses for spirits of turpentine, mostly as a solvent for rubber manufacturing and as an illuminant, created a demand for turpentine that began to rival that for tar and pitch.

Tar kiln circa 1920

Turpentine spirits also had many uses around the home and the farm. Like other gum derivatives, it long had a folk reputation, whether medically sanctioned or not, as an all-purpose remedy. One dangerous epidemic that spread throughout the rural areas around Raleigh early in the 20th century was treated successfully with a remedy made of the following ingredients:

⅓ teaspoon castor oil
10 to 15 drops laudanum
10 to 15 drops turpentine
Take after each meal and before bedtime.
(Lower the dose for children.)

"We used to take turpentine spirits on sugar as a medicine," Shaw told me. "A teaspoon of sugar and three drops of turpentine. You took it when you had a cold or the flu. You could smell it in your urine, so it went all over your system."

Rosin wasn't as valuable at first, and was often discarded as worthless, especially when the price was low. But by the end of the 19th century, rosin was so valuable that expeditions were mounted to locate and mine beds of solid rosin that had been dumped in creeks, lakes and ravines around the Southeast.

On the farm or in the home, rosin could be used as a preservative, a waterproofing agent on boots, shoe polish and in making sealing wax for preserving fruit. Cooks sometimes heated a potful of rosin and cooked potatoes in it. During the hog-killing season, rosin added to a vat of boiling water would coat the hog's skin, making it easier to scrape off the hair. Farmers could do the same to remove the feathers of geese and ducks.

In the 20th century, rosin found other uses. Sweaty baseball pitchers fingered bags of rosin dust on the mound. Ballerinas rubbed rosin on their shoes to prevent slipping. Violin players rubbed it on their instruments. It was an ingredient in matches, roofing materials and flypaper, in firecrackers and shoe polish.

While we sat on his porch and ate our lunches, Shaw and I talked about how the term "Tar Heel" arose. There are all kinds of explanations. According to the "official" version, Tar Heel was used first as an epithet and then became a badge of honor, beginning in the Civil War. Tar was so synonymous with North Carolina by then that Confederate troopers from other southern states habitually used the term to refer to North Carolinians. After one battle in which the North Carolinians failed to hold a hill, a group of Mississippi soldiers told them that they had forgotten to tar their heels that morning. But on another occasion, it was the Virginians who had retreated, and a smart-alecky North Carolinian who told them that Jefferson Davis was going to put tar on their heels "to make them stick better in the next fight."

Shaw told me his own explanation of how the term arose. While ladling the tar into barrels, the tar burners would inevitably spill some, which would stick to their bare feet and naturally accumulate a lot of pine straw. This would be attached until the tar wore off. "The men would actually have shoes of leaves for months," he said.

The story had the ring of experiential truth about it. The sight of tar burners walking about the woods with tufts of pine straw dragging at every step must have been just comical enough to make Tar Heel a natural expression.

In between bites of cheddar and slugs of grape drink, Shaw told me how he'd like to burn a tar kiln someday and let kids watch. "I think it would be fascinating for them. We could build a little lean-to like they used to do, and bring some meat and sweet potatoes out with us. The kids could camp out, roast the potatoes, stay the night. Now, that would stick with them, wouldn't it?" ⊠

Frog Nights

What sort of people would spend the evening hip-deep in the water, gnawed on by mosquitoes, trying to catch musical amphibians? Only those who love 'em.

written by David Lee ©1997

It had been at least 15 years, perhaps 20, since my last frog hunt. But a warm, rainy night in June was something I could no longer ignore. It was the perfect night for frogs. I'm not talking about anything practical like gathering frogs so I could pop their legs into a frying pan, or conducting research on the frog's behavioral ecology, but simply a childlike desire to watch frogs going about the business of being frogs. In addition to frogs, only a few basic ingredients are required to quell this desire: a pond, rain and the dark of night.

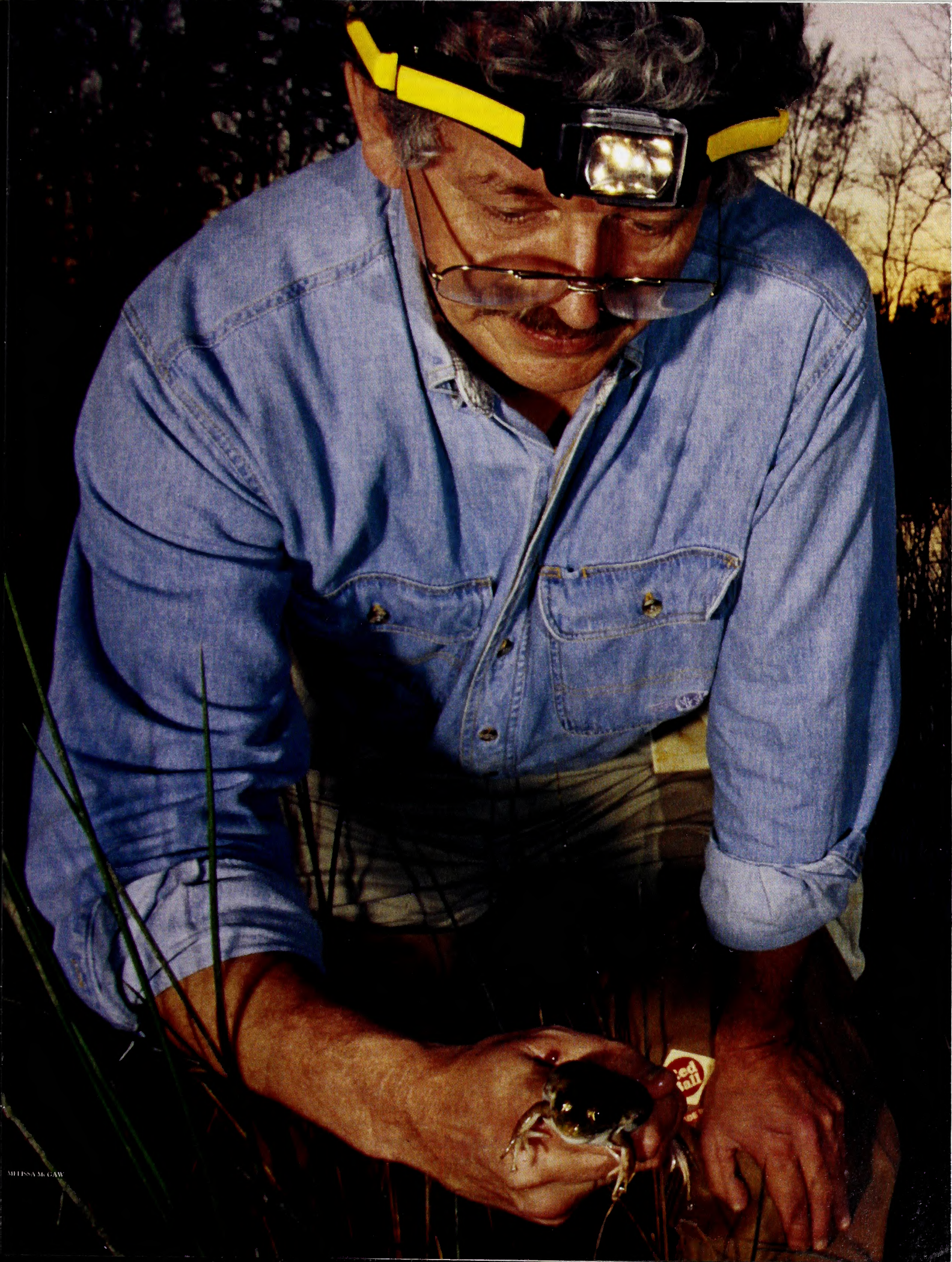
While scrounging about in the back of the bedroom closet for a pair—preferably a matched pair—of old tennis shoes, I tried to think of someone, anyone, who might enjoy going along. Since all my friends had grown up, I concluded that perhaps I'd be better doing this by myself. Grabbing an old hat, the car keys, and the most surprising find, a flashlight that actually worked, I was out the door. My neighbor's farm pond was only a few miles down the road, and I found a low but wet place to squeeze under his barbwire fence. The frogs, in full serenade when I drove up, went abruptly silent. I sloshed over to a stand of willows, turned out my light and waited.

The green frogs were the first to start. Their single banjolike notes twanged from the far side of the pond. Within moments a few from my corner of the pond answered. Then the cricket frogs switched on. One or two timid notes soon turned into an incessant, not quite deafening, chorus of raspy clicks. Hundreds of half-inch-long male cricket frogs were making their presence known, each hoping there were hundreds of half-inch-long, egg-heavy female cricket frogs that would be enamored by their songs. Somewhere mixed into all this were a small number of whining Fowler's toads. Their long trills were unmistakable. Unlike the green frogs and cricket frogs that live in and around the pond through the year, the toads wait for a night like this and arrive from afar. Traveling on rainy nights, they come to breed and then quietly return to the woodlots and garden paths where they actually live. This was the first warm rain of the season; the toads would increase in number during the next few days.

Another trilling song. This one was less than 3 feet away, a gray tree frog calling from about 6 feet up in the willows. I allowed it to sing a few more times and then turned on my flashlight. The frog was positioned precisely where a small limb emerged from the trunk. To my delight it continued to sing while sitting in the spotlight. With every trill it would inflate a ball-shaped throat pouch. Then it would pause, semi-deflate its pouch and then start this process again. The length of each song, as well as the time between songs, was consistent and matched the cadence of the other gray tree frogs that were joining in from the darkness. I moved slowly around the pond, visiting with each of the other species. None was as cooperative as the first gray tree frog, but, for the most part, the frogs were accustomed to my presence, and the periods in which the air became silent became shorter and shorter. After I had captured several individuals of each species in the beam of the flashlight, I called it a night.

Later at home, while throwing all the wet, muddy stuff into the washing machine, I reflected on the experience and those of my younger days. In my youth I was obsessed

***Guided by its** characteristic song, curator John Groves of the North Carolina Zoo catches a green frog from a coastal pond. A pond is a lively place in spring as the males of dozens of frog species sing their courting calls to attract mates.*



MELISSA McGAW

JACK DERMID

Spring Peeper

with catching frogs. In fact, it was through frogs that Skip Bellin and I discovered the free-enterprise system. I had found a company in Wisconsin that would give us 10 cents apiece for spring peepers. I called and asked the company how many they wanted. "As many as you can get," was the response. There were hundreds of thousands of frogs out there. We were two junior high school kids about to make our first fortune in the frog business. In hindsight I think they assumed the kid attached to the school-aged voice on the other end of the phone was not wise in the catching of frogs. We lined a big box with plastic, added some damp moss, sealed the box tight and worked the peepers inside through a funnel. After getting 300 spring peepers inside, we sealed the only opening, added some air holes and shipped off our inventory. A week or so later we got our check, but an accompanying note said that they were not in need of any more peepers that season.

In time my obsession with frogs had ripened. During my college years I was photographing them or capturing their voices on tape. But times change, and I guess I've changed along with them. Now I just go out to watch. It's like bird-watching, only darker and wetter.

To enjoy the experience of standing in a frog pond on a rainy night, it's necessary to know what you are hearing and what you might see. At the very least, you should know what frog species might be found there and what their songs sound like. In time, you'll discover the little secrets of the frog's natural history that makes a frog breeding pond such a worthwhile place to visit.

For example, when I was collecting frog voices with shotgun mikes and reel-to-reel high-speed tape recorders, one problem that I continually faced was getting a clear, clean recording of an individual frog. Not only did the recorder pick up sounds of automobile traffic, barking dogs and, worst of all, helicopters, there were always all the other frogs. Frogs of the same species, frogs of different species, deafening choruses of mixed frog voices. Most frog songs are of relatively low frequency, which carries well and records well. I had to work at finding sites and times when only one species was vocalizing. Spring peepers are easy; few other frogs sing in late winter, so by picking habitats that were unsuitable to chorus frogs, for example, I could find a pure spring peeper chorus. The next problem was to record a single frog. If I made enough noise splashing about in the shallows I could get them all to shut up. Then it was a matter of chance to be close enough to the first one to tune up and record it before the others started in. If I didn't get it in the first few tries, the frogs became so conditioned to my presence that there were few silent periods.

On some nights, however, the least movement on my part would shut down the entire chorus. I learned to use the frog's predictable response to aircraft passing overhead. For some reason the sound would trigger a vocal response. Within half a minute the entire male

JACK DERMID

Southern Cricket Frog

population of frogs was back into full song. Knowing this would allow me to get the tape recorder running just as the frogs started up. Still, it was frustrating, and some nights I would just let the recorder run and then edit the tape later the next day. This led to some interesting and quite unexpected discoveries.

Consider spring peepers, for instance. By just recording random segments of the chorus, it became clear that there was a pattern to what to my ear had sounded like vocal chaos. The male spring peepers were singing in little trios. The entire pond chorus was actually composed of many independently operating trios, each of which had a lead singer, with the other two joining in a way not unlike the rounds we sang in grade school. When the trio shuts down, it is always the same male that leads off. This explains why, as a frog-catching youngster, I always had trouble locating spring peepers. They often sing while sitting in full view, but the trio's song has a peculiar effect, like that of a ventriloquist throwing his voice, so I always found myself looking in the wrong direction.

Another interesting discovery about frog song came from studying my potluck recordings of frogs. On one tape I had no fewer than six species of tree frogs recorded simultaneously. When I analyzed the tape on a sound spectrograph—a piece of gee-whiz science equipment that depicts sounds as readable images—I could see that each frog species showed up clearly. Though so many frogs of each species were singing at the same time, their voices did not appear as individual songs but as collective voices, with each species' voice occupying a different frequency. This is how females can hear the males of their kind. Each species of frog has a distinct carrier frequency that is not drowned out by the others. While we hear a wall of frog noise, the individual frogs are tuned in to a single frequency range. For frogs living year-round in the pond, or ones coming from afar, the effect is the same—they can discriminate and hear only what they need to hear.

The story gets even better. As it turns out, low-frequency sounds carry best. I knew this from all the background interference I was getting on my tapes. Low frequencies carry better through the air, and even better through water, than do higher ones. Frogs with deep, low voices have an advantage in that they can be heard by females at a greater distance. The catch is that low-frequency sounds take a lot more energy to produce. The frogs producing low-frequency sounds tend to have greater intervals between their songs, and as one would predict, they are larger species. Conversely, the smallest frogs have the highest-pitched voices, but their songs expend less energy.

Why don't the big frogs with the deep, loud voices drown out the sounds made by the little ones? Each species is primarily tuned in to its own frequency. In principle, it is not unlike listening to a radio station. All those sound waves are out there, but you only hear the station you tune in.

JACK DERMID

Fowlers Toad

There is one more layer to this story. The different tree frogs I simultaneously, but not purposely, recorded not only sing at distinct carrying frequencies, but each has its own particular calling station. Not only are these calling sites species specific, but they also relate to the frog's voice. The species that sing on the highest frequencies select calling stations that are well above the water's surface. The additional height allows their songs to broadcast further without an additional expenditure of energy.

For example, the pinewoods tree frog, a common amphibian throughout eastern North Carolina, sings while clinging to emerging shoreline vegetation about a foot above the pond. Its carrier frequency is 4,800 cycles a minute. The squirrel tree frog, a species that also inhabits many of the areas occupied by the pinewoods tree frog, sings right at the waterline. Its voice is over a thousand cycles per second lower. The lower frequency travels better in the pond vegetation. To partly make up for the extra energy it takes, the squirrel frog's song lasts only about 1/5 as long as that of the pinewoods tree frog. There are other species that have even lower frequencies and shorter, more widely spaced songs. Most of these frogs sing while partly submerged in water, and their voices carry through the water as well as the air.

Frogs using the same ponds can also isolate themselves reproductively from other species by breeding at different times of the year. In North Carolina there are a few hardy species that breed on warm nights in the winter. Others are synchronous, with the entire local population keying in on some environmental stimulant and all breeding during a period lasting a few days. Still others have very protracted breeding periods—a few individuals can always be heard calling on any warm summer night. This staggered use of the breeding season not only helps eliminate confusion on finding the proper mate, it also allows tadpoles to alternate use of the nursery site. All this is controlled by seasonal fluctuations in the climate, as well as the individual species' programmed response to often minor increases in day length, water depth, temperature, barometric pressure and the amount of precipitation.

JACK DERMID

Green Treefrog

Another way frogs segregate themselves when breeding is by using different types of ponds. Several species whose tadpoles develop quickly can use temporary pools. The record goes to the spadefoot toad, whose entire egg development and transformation from tadpole to miniature adult take as few as 14 days. In contrast, it may take three seasons for bullfrog tadpoles to mature. Because of this, bullfrogs must lay their eggs in permanent ponds. Most frogs, however, choose bodies of water that are in between these extremes. Shallow ponds that go completely dry on occasion work well for most. The drying out prevents predatory fish from becoming established, and thus the pond yields a larger crop of froglets. The shallow ponds also heat up more quickly, and often schools of thousands of tadpoles can be seen along shorelines, where the water is warmest. The higher temperatures enable tadpoles to digest their food more quickly and thus accelerate growth.

JACK DERMID

Pine Woods Treefrog

Species-specific voices and behaviors help assure each species a well-defined place in the competitive, heavily populated and very loud breeding community. As the females arrive at the breeding pond, they instinctively know in what portion of the pond the right males are to be found. The distinct voice of the male assists her in locating a mate, thus eliminating wasteful mismating and the possible production of hybrid offspring.

Because of the effectiveness of this reproductive isolation, there are only a few documented instances of natural hybridization. In most cases the hybrids appear singly, representing unusual occurrences. However, man is constantly tinkering with nature, and the creation of artificial ponds, or the alteration of natural ones, sometimes prevents the adult frogs from assuming their proper roles. At such times hybrid swarms of first-, second- and sometimes even third-generation offspring appear, and specific identity becomes lost. The only hybrid frog I ever encountered was a mix of green tree frog and barking tree frog genes. I tracked down the single male by ignoring the voices of hundreds of other frogs. Its voice was clearly different, and I could not even guess who the singer might be. The green tree frog typically calls a few feet above the water while clinging to emergent vegetation with suction-cupped toes. Its voice is a loud "queenk, queenk, queenk" and is produced at a dominant frequency of about 3,400 cycles per second. The larger barking tree frog sings while floating on the surface of the water. It notes are much deeper, about 430 cycles per second, and spaced at longer intervals. "Tonk, tonk,..."

JACK DERMID

Gray Treefrog

The frog I tracked down was intermediate in size, coloration and voice. Its calling site was emergent plants, but it sang from only a few inches above the water. Physiological, and probably ecological, misfits such as this frog probably have little influence on the frog populations, as long as natural environmental conditions are maintained. I theorized that this frog came about because some outside factor such as ice or wind had sheared off the emergent vegetation earlier in the season, forcing two closely related tree frogs to search for mates while swimming on the pond's surface. The existence of this hybrid underscores the necessity of behavioral isolating mechanisms, and the oddity of finding one attests to the fact that these mechanisms work.

There is a lot to be learned by squandering a little time in frog ponds, and only bits and pieces of the story become available on any particular rainy night. I haven't even begun to discuss what all this frog activity leads up to. When froggie goes a' courtin,' he and, yes, she are interested in but one thing...and it's not billiards. Frog sex is a very complex business. If it's still raining tomorrow, I think I will get my tennis shoes out of the dryer and take a second look. ⊠

Licenses to Go!

Beginning next month, all North Carolina hunting, fishing and trapping licenses and permits will be sold by license agents statewide through a new computer system. Here's what to expect.

written by Rodney Foushee / photographed by Melissa McGaw

You stroll into your local bait and tackle shop ready to pick up that hot new bass lure, some insect repellent and a new fishing license. It's going to be a great day on the lake. But instead of the license agent grabbing that familiar metal box of forms and stamps to painstakingly write out your license by hand, she asks for your driver's license. Using a computer the size of a credit card machine and a miniature keyboard, she quickly types in your driver's license number and a few bits of information. In less than a minute, a durable, waterproof license rolls off a small printer. You pay your money, fold the license in two and you're done.

Welcome to the N.C. Wildlife Resources Commission's state-of-the-art Customer Support System (CSS.) More than a year in the making, the computer system is designed to pay for itself while reducing mounds of paperwork and helping the Wildlife Commission better manage the state's wildlife and freshwater fisheries. But above all, CSS puts a premium on speedy customer service.

"This is truly a positive step for the Wildlife Commission," said Russell Rhodes, who manages Neuse Sport Shop, a pilot CSS agent in Kinston. "Whether a person is registering a boat or buying a hunting or fishing license, this system gives the customer instant gratification."

The Wildlife Commission launched the point-of-sale system in March, when 400 Wildlife Service agents across the state went online to register boats. In a matter of minutes, agents at marinas, tackle shops and boat dealerships can permanently register vessels using the computer—ending a process that used to take up to two months. Renewing boat registrations is even quicker.

Beginning July 1, all hunting, fishing and trapping licenses and special hunt permits will also go on sale through the system, with the addition of 900 Wildlife Service agents. Getting a new license will be as easy as finding the nearest hunting supply or tackle shop in your area. Licenses can also still be purchased over the telephone using credit cards via the toll-free number 1-888-248-6834 (2HUNTFISH.)

While purchasing a fishing license under the new system takes less than a minute, hunting licenses will take slightly longer to process. That's because, beginning this year, North Carolina must comply with the federal Migratory Bird Harvest Information Program (see "*What is HIP?*")

***The Wildlife** Commission's new Customer Support System will mean less waiting time for hunting and fishing licenses.*

When buying a license, hunters will be asked four brief questions to determine if they plan to hunt migratory game birds, including waterfowl, doves, woodcock, snipe, rails and gallinules. Once the questionnaire is completed, a HIP certification mark will be placed on the new license.

"The questions might be a slight annoyance to some, but we ask hunters to be patient," said Richard Hamilton, the Wildlife Commission's assistant director. "This information is required by the U.S. Fish and Wildlife Service and must be collected if we are to continue hunting migratory game birds. The Fish and Wildlife Service will use the information to sample hunters for surveys to collect information needed to manage bird populations and analyze the impacts of hunting." The computer licensing system will also allow the Wildlife Commission to quickly survey hunters and anglers on a variety of topics in the future.

Despite the HIP questions, Hamilton estimates it will take just four minutes to issue a routine hunting license with the new system. That's faster than the former handwritten license.

In addition to a new license, big-game hunters will be issued tear-resistant, waterproof tags with self-adhesive backs—a vast improvement over the old paper game tags. Wildlife agents will be able to replenish big-game tags as well as issue replacement licenses using the computer system.

Under the new system, no stamps will be required because all privileges will be spelled out on the license. However, waterfowl hunters who want to collect the traditional duck stamp can still receive one at no charge.

With more than 700,000 hunting, fishing and trapping licenses issued in North Carolina each year and more than 316,000 registered boats to keep track of, the Wildlife Commission set a priority to develop a system to better serve customers through local license and vessel agents. The point-of-sale capability offered through the network of Wildlife Service agents is the centerpiece of the Customer Support System, which will be expanded in the future to include other services such as subscriptions to *Wildlife in North Carolina*.

"This new system was designed to provide a more efficient way for the Wildlife Resources Commission to serve the public and gather information," Hamilton said. "We are confident this is a more efficient and effective use of registration and license fees."

And the system is faster, which means you might just get a few more casts in instead of waiting at a store counter for a handwritten license. ☒

What Is HIP?

The N.C. Wildlife Resources Commission's new computer licensing system will help North Carolina bird hunters easily register with the federally mandated Migratory Bird Harvest Information Program. But what exactly is HIP?

HIP is a new method to help state wildlife agencies and the U.S. Fish and Wildlife Service develop more reliable estimates of the number of migratory game birds harvested throughout the country. While duck harvest surveys have been conducted for years, information on doves, woodcock and other webless species is sorely lacking. Such information will help biologists make sound decisions about hunting seasons, bag limits and population management. All states except Hawaii must comply with HIP by 1998.

Beginning July 1, Tar Heel hunters will be asked four questions to determine if they plan to hunt migratory game birds, including waterfowl, doves, woodcock, snipe, rails and gallinules. Once the questionnaire is completed, a HIP certification mark will be placed on their hunting license, and the information will be quickly forwarded to the Fish and Wildlife Service.

A randomly selected sample of bird hunters will later be contacted and asked to complete a migratory bird harvest survey during the hunting season. The voluntary information reported will be anonymous, and the list of hunters' names and addresses will be destroyed after the survey is completed. Most hunters' only involvement in HIP will be answering the four license questions.

Far from limiting hunting, HIP will give wildlife managers data to protect existing hunting programs from emotion-based legal challenges. "These surveys will help us defend our harvests and hunting seasons while protecting species in decline," said Carl Betsill, manager of the Wildlife Commission's Research and Regulations Section. "HIP will improve our database on harvests so our decisions can be based on sound information and science."

All North Carolina migratory game bird hunters are required to have a current HIP certification in addition to a valid license while hunting during the 1997 season. Exempt from the requirements are hunters not required to have a license, including those under 16 and landowners who hunt on their own property. Lifetime license holders will be mailed a postcard so that those who hunt migratory birds can become HIP certified. They can also obtain HIP certification through any Wildlife Service agent at no charge.

Canadas in Space

Biologists Use Satellites to Track Outer Banks Geese

Written and Edited by Rodney Foushee

State wildlife managers hope sophisticated satellite tracking technology will help them better understand the migration patterns of the few remaining wild Canada geese that winter in coastal North Carolina.

Once a haven for hundreds of thousands of migrant Canadas, the sounds, marshes and lakes of northeastern North Carolina now support just a few thousand migrating Canada geese each winter. Masking the decline of the wild geese, the number of resident Canada geese, which do not migrate, has exploded over the past decade to the point they are considered pests in urban areas.

In February, N.C. Wildlife Resources Commission biologists trapped three wild Canada geese using rocket nets on Pea Island National Wildlife Refuge—where a small enclave of migratory Canadas can still be found. Biologists estimate as many as 400 migrant geese use the Outer Banks refuge each winter. The geese were released after being fitted with flexible harnesses, each of which carries a tiny transmitter. The lightweight harnesses fit around the birds' bodies and under their wings but don't hamper movement. A fourth Canada goose was captured a few weeks later and outfitted in the same manner.

Using the French-based ARGOS satellite tracking system, biologists can follow the progress of the birds' migration. Each transmitter sends a signal to one of several satellites in orbit around the Earth. After receiving the signal, the tracking system pinpoints each goose's location daily and downloads the information back to Earth. The system, which has been successfully used on other long-ranging animal species, has revolutionized tracking studies.

MELISSA McGAW

Biologists attach a small *satellite transmitter to a wild Canada goose that was caught at Pea Island on the Outer Banks. Scientists hope satellite tracking will help them better understand the migration patterns of the dwindling number of Canada geese that winter in North Carolina.*

"The kind of detail the satellite system offers would not be possible with traditional neck collar or radio telemetry tracking," said Dennis Luszcz, the Wildlife Commission's waterfowl project leader. "We can get locations all over the world no matter how remote the birds go."

Little is know about the migratory routes of the Outer Banks geese, which biologists suspect could be a separate subpopulation. Unlike mainland Canadas, the birds spend most of their time while in North Carolina on open water feeding on submerged vegetation. "We think these Outer Banks geese are unique from inland geese which roost on water but feed on land," Luszcz said. "These birds are slightly different in appearance and may be a separate subspecies, but not a lot is known about their migration patterns or stopover points."

By late March, the first three harnessed geese had traveled northwest to western New York while the fourth bird was still at Pea Island. The geese should ultimately end up somewhere in Canada where they will nest this summer before making a return trip to North Carolina. The transmitter batteries will last up to two years giving scientists detailed information about the birds' movements over several seasons. Wildlife Commission biologists plan to capture six more adult geese this winter at Pea Island and outfit them with transmitters.

The Outer Banks project is part of a larger satellite tracking study of Canada geese being conducted along the Atlantic Flyway in cooperation with Cornell University researchers and Ducks Unlimited. The information from the study should help waterfowl managers identify and protect important staging areas used by migrating Canada geese as well as pinpoint the breeding grounds that contribute to various goose populations.

Natural Resources Conservation Science Fair Awards

North Carolina Student Projects Show Concern for Environment

How does weather affect a bird's eating habits? Do beaver dams improve water quality? What effect does detergent have on pond life?

These are just a few of the questions asked and answered by more than 2,000 students around the state in this year's Natural Resources Conservation Science Fair projects.

Each year the N.C. Wildlife Resources Commission's Division of Conservation Education sponsors the projects, which are judged at eight regional science fairs held around the state. Awards are presented to students whose science projects recognize the importance of natural resource conservation through interesting and innovative activities. Winners are selected by Wildlife Commission personnel.

The science fairs are exhibitions of projects prepared and presented by students under their teachers' guidance with the help of others interested in the science topic being explored. The fairs are coordinated by the N.C. Association of Science Teachers and the N.C. Math and Science Alliance.

In every region, $50 awards and a plaque are given to winners in the Elementary (grades 3 to 5), Junior (grades 6 to 8) and Senior (grades 9 to 12) categories. Merit awards may go to any age category and include a plaque. The following students won regional science fair awards in 1997:

Region 1 Senior Division
Kristen Edwards of Hertford County High School for "Get the lead out."

Region 1 Junior Division
Reagan Williams of Chowan Middle School for "The comparative study of animal insulators."

Region 1 Merit Award
Katherine Burke of St. Peter's Catholic School for "What are the food preferences of birds?"

Region 2 Senior Division
Caitlin Fritz of John T. Hoggard High School for "A study of runoff in the lower Cape Fear River."

Region 2 Junior Division
Christopher Millis of Topsail Middle School for "How does weather affect a bird's eating habits?"

Region 3 Senior Division
Terrell Floyd of J.F. Webb High School for "Diatoms—A comparative study of the water environments in Granville County."

Region 3 Junior Division
Ali Howard of West Lake Middle School for "What effects does a broken dam have on its surrounding environment?"

Region 3 Elementary Division
Annie and Abigail Boehling of Cary for "Owls—Perfect predators."

Region 4 Senior Division
Steve Settle of East Columbus High School for "Troubled waters."

Region 4 Junior Division
Wesley Brennan of the Clarkton School of Discovery for "The effects of hog farm runoff on aquatic life."

Region 4 Elementary Division
Kathryn Adams of Angier Elementary School for "What effect does detergent have on pond life?"

Region 5 Senior Division
Jonathan Gimmarco of Forsyth Country Day School for "The effect of contact herbicides, respiratory inhibitors and photosynthetic inhibitors on aquatic duckweed."

Region 5 Junior Division
Jon Tomlinson of Mendenhall Middle School for "Testing the test."

Region 6 Junior Division
Meredith Lentz of North Rowan Middle School for "Does color enhance the heating process of salamander bodies?"

Region 6 Elementary Division (tie)
Ashley Graham of Mount Ulla Elementary School for "Effects of phosphate on pond life."

Region 6 Elementary Division (tie)
Bryan Dugan of Hurley Elementary School for "Are our schools hurting the environment?"

Region 7 Senior Division
Jennifer Allen of Hibriten High School for "Blowing in the wind."

Region 7 Junior Division
Jayson Turner and Clay Savely of Northwest Ashe High School for "Do beaver dams improve water quality?"

Region 7 Elementary Division
Bryson Cornett of Dobson Elementary School for "Buried but not forgotten—The trash graveyard."

Region 8 Senior Division
David Matthew Jones of East Rutherford High School for "Canaries of the stream."

Region 8 Junior Division
Britt Helms and Tim Watts of Marion Christian Academy for "To lime or not to lime?"

KEN TAYLOR

***Ali Howard (right),** a seventh-grader at West Lake Middle School in Apex, is congratulated by her teacher, Peggy Bailey, for winning a Natural Resources Science Fair Award. Ali's project examined the effects of a broken dam on its surrounding environment by comparing habitats near active and inactive dams.*

Officer of the Year

Federation Honors Wildlife Enforcement Division Sergeant

Keith Templeton of Salisbury, a sergeant with the enforcement division of the N.C. Wildlife Resources Commission, has been named wildlife officer of the year by the N.C. Wildlife Federation.

Sgt. Templeton, who serves in Wildlife District 6, received the Wildlife Federation honor during the Governor's Awards banquet which closed the 52nd annual convention of the conservation organization at Research Triangle Park.

Sgt. Templeton, a 12-year veteran with the Wildlife Commission, began his career as a trainee in Jackson County. He served as an enforcement officer in Buncombe County and was promoted to sergeant in 1993. His present area of supervision in District 6 includes Cabarrus, Davidson and Rowan counties.

Also honored by the Wildlife Federation as officers of the year for their respective wildlife districts were: 1- William Poole, Scranton; 2 - Milton Jones, Simpson; 3 - Robert Sharpe, Seaboard; 4 - Brentley Ward, Lumberton; 5 - J. Ashley Thompson, Siler City; 7 - Rocky Hendrix, Wilkesboro; 8 - Mitchell Kirkland, Belmont; 9- Michael Stephens, Andrews.

BODIE McDOWELL

***Sgt. Keith Templeton of** Salisbury (right) is congratulated by Wildlife Commission Chairman John Lentz after being selected as the wildlife officer of the year by the N.C. Wildlife Federation.*

Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

June 1-30

American Rivers Month will be celebrated around the nation with the theme this year "The River as a Gathering Place." Check local newspapers for fishing events, canoe trips, river festivals and education seminars. For more information about activities to celebrate and heighten awareness of our rivers, contact the conservation group American Rivers, 801 Pennsylvania Ave. S.E., Suite 400, Washington D.C. 20003, or call (202) 547-6900.

June 2-8

National Fishing Week will be celebrated across the country. Check local newspapers for events and activities in your area.

June 15-20

The 15th annual Fur, Fish 'N Game Rendezvous camp will be held at the Millstone 4-H Camp near Ellerbe. Campers ages 12 to 15 will study topics including environmental ethics, wildlife photography, fishing, canoeing, marksmanship, orienteering and first aid. A new advanced camp is open to youths who have successfully completed the first camp and are interested in an outdoor resources career. For more information, call David Drake or Scott Payne at (919) 515-5636.

Reader's Letter

Snapper Tales and Fish Scales

Dear Wildlife,

It's likely you received lots of snapping turtle stories after the "Revenge of the Snapper" column (February 1997 issue) appeared. Here's one more (from a retired captain in the Wildlife Enforcement Division.)

In the early 1960s, Capts. Wilton Pate, Jimmy Alston and myself (all now retired) found ourselves in a paddle boat at night on Blounts Creek in Beaufort County checking on an illegal netting report.

As soon as the culprits came motoring by, we had to paddle like mad to keep the netters in view. Finally, they fished the last net and headed for the landing with us puffing behind.

All three of them were surprised when we paddled up. The bottom of their boat fluttered with illegal fish.

Pate and Alston began writing citations and I stepped into their boat and started picking up the fish and putting them in buckets. At last, I couldn't see any more fish in the moonlight and clicked on my flashlight. Luckily, this was just before I would have placed my hand in the mouth of a huge snapper that had backed up in the boat's bow.

This caused some laughter among everyone as I'm sure the culprits and maybe even Wilton and Jimmy were waiting to see me grope that snapper in the dark.

After everything settled down, the trio said they wanted the turtle. We agreed they had acquired it legally and were entitled to it. One of the men carried it back to their old station wagon and placed it in the back. As we went over our final instructions concerning the citations, the wagon's horn starting blowing. We all ran over to discover that huge snapper had climbed over two seat backs and was standing in the driver's seat blowing the horn with its front feet!

—John Kennedy
Whiteville, N.C.

Venison Continues to Feed the Needy

North Carolina Hunters for Hungry Sets Another Record

Despite the disruption of a major hurricane, North Carolina deer hunters were still able to donate a record number of deer to feed the needy last year.

Hunters donated 330 deer last season to the N.C. Hunters for the Hungry program—up from 307 deer in 1995, the previous record. That's about 33,000 pounds of deer for 1996 and brings the overall total since the non-profit group began four years ago to more than 85,000 pounds.

"It is impressive that even with Hurricane Fran disturbing the woods and hunting efforts, North Carolina hunters were able to exceed the 1995 total," said Ernie Seneca, president of N.C. Hunters for the Hungry. "Every hunter who donated a deer can be proud. It gives you a great feeling to share an abundant resource with your community."

Through a cooperative effort, Hunters for the Hungry brings together hunters, outdoor associations, meat processors, state meat inspectors and hunger relief organizations to help feed North Carolina's hungry. The donated deer are processed into ground venison and distributed to homeless shelters, soup kitchens and food banks across the state. Each deer, served in pasta dishes and soups, can feed about 120 people.

NORTH CAROLINA HUNTERS FOR THE HUNGRY

Taking Aim Against Hunger

Donated deer must be harvested, tagged and reported in accordance with N.C. Wildlife Resources Commission regulations. The program also accepts deer legally harvested in other states. Deer are delivered to one of 21 participating meat processors, where the venison is ground and packaged into 2- to 3-pound packages.

More hunter participation, processors, sponsors and volunteers are still needed to keep the worthwhile program growing. Hunters for the Hungry pays the processing fee for each deer used through contributions and fund-raising events. For program information, contact N.C. Hunters for the Hungry, P.O. Box 10502, Raleigh, N.C. 27605-0502, or call (919) 557-8090.

License Sales Up

Number of Hunters, Anglers Remains Constant

The number of U.S. hunters and anglers has remained relatively constant even as sales of licenses, tags and other permits continues to rise, according to the latest U.S. Fish and Wildlife Service figures.

The agency reported that 15.23 million hunters bought licenses in 1995—the current study year—a slight decrease from 15.34 million in 1994. Hunters bought a moderately increased number of licenses and permits—spending $532.6 million compared with $525.8 million in 1994.

Meanwhile, the number of anglers nationwide rose slightly to 30.33 million in 1995 from 30.24 million in 1994. Anglers bought about the same number of licenses as in 1994, but spent considerably more to do so, $448.6 million compared with $424.7 million the previous year.

License revenues support state wildlife conservation agencies including the N.C. Wildlife Resources Commission.

"Hunters and anglers continue to pour millions of dollars directly into wildlife conservation, benefiting all Americans," said the Wildlife Service's Acting Director John Rogers.

The number of hunting license holders nationwide has declined in the past 13 years from a record high of 16.7 million in 1982. Meanwhile, the number of fishing license holders has been about the same for the past decade.

—Information courtesy of the U.S. Fish and Wildlife Service

McCall Small Game Awards

Each year the N.C. Wildlife Resources Commission presents the Dr. William H. McCall Small Game Award to recognize individuals and groups that promote small-game management and conservation in North Carolina. This year, awards were presented to Duke Power Co.'s Belews Creek Steam Station and Roger Hansard, a Raleigh-based federal official.

The steam station, located on Belews Lake in the Piedmont, was honored with the organization award for its practices managing wildlife habitat on its land. Station employees in 1994 began planning to enhance and encourage wildlife on 700 acres at the site. The plan, developed by Duke Power and Wildlife Commission biologists, specified management practices for small game including rabbits and quail, as well as big game and non-game species. Employees at the station established food plots, used prescribed burning to encourage new growth and mowed power line rights of way to provide food and cover for wildlife.

Hansard, who works for the Natural Resource Conservation Service, received the individual award for cooperating with Wildlife Commission staff to develop recommendations for improving wildlife benefits in farm programs. He was recognized for his continuous search for new ways to include wildlife when working toward other conservation goals. Hansard serves as North Carolina's acting plant materials specialist and has worked with the Wildlife Commission for many years in finding and testing new plant varieties that can be used by wildlife, including various species of warm season grasses.

—Bodie McDowell

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

Wildlife Endowment Fund Report

Totals Through March 1997

Principal Balance
$23,624,843.39

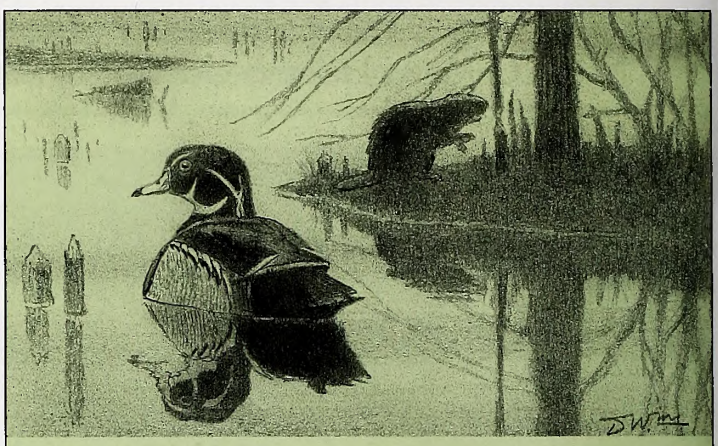
Interest Earned
$21,993,700.19

Total Receipts
$45,618,543.58

Interest Used
$10,050,147.48

Fund Balance
$35,568,396.10

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission, programs, the principal remains invested to generate additional interest for the future.



Hurricane Beavers

by Rodney Foushee

Contrary to what some eastern North Carolina landowners might now be thinking, hurricanes don't spawn beavers. But they sure do help these natural engineers complete their tasks ahead of schedule.

With many eastern streams already clogged with limbs and logs courtesy of Fran, it doesn't take an industrious beaver long to add the final touches to back up a waterway and flood the land. Not that beaver dams are all bad. The ponds they create provide ideal wetland habitat for wood ducks, fish and plenty of other wildlife. Beaver ponds also improve the water quality of streams and rivers by reducing soil erosion and allowing sediment to settle out.

But that offers little comfort to landowners when valuable crops, timber and roads are damaged by beaver-induced floodwaters. Fortunately, there are solutions.

One of the best ways to solve beaver problems is the N.C. Beaver Management Assistance Program. This cooperative cost-sharing program, administered by the U.S. Department of Agriculture, provides technical information and assistance to landowners in 27 participating eastern counties.

After a free initial site visit, a trained wildlife specialist explains the most effective non-lethal and lethal methods for dealing with beaver activity. The wildlife specialist then recommends the best course of action and will begin working on the solution if desired by the landowner. The average cost to landowners receiving services is about $50 but is higher for dam removal. Free training is also available for those who wish to conduct their own beaver control activities. For more information about the program, call (919) 856-4124.

A handy bulletin published by the N.C. Cooperative Extension Service titled *Wildlife Damage Management: Beavers* also outlines various beaver control methods available to landowners. The eight-page guide covers non-lethal controls including the use of pond levelers and exclusion fences to protect trees and drains, as well as lethal methods like shooting and trapping. The free bulletin is available from your local Cooperative Extension Service office.

Wildlife Commission Spotlight

Enforcement Officers Lead the Way

KEN TAYLOR

A Season of Boating Fun. For wildlife enforcement officers with the N.C. Wildlife Resources Commission, enforcement of boating laws becomes a major duty during the spring and summer months. The presence of marked patrol boats has increased the public's awareness of the need to operate boats safely. Officers strictly enforce the laws against operating a boat in a reckless or negligent manner or while intoxicated. Law enforcement on the water helps provide for safer and more enjoyable waterways.

KEN TAYLOR

Officers Show How. In addition to patrol duties, wildlife officers assist various groups and organizations by providing instruction on boating and water safety. The Wildlife Commission offers a boating safety course that is taught in many junior high schools across North Carolina. To report a boating accident or any wildlife violation, call 1-800-662-7137.

MELISSA McGAW

Checking It Out. Wildlife officers inspect boats for compliance with state, federal and local laws. Routine inspections include checking for valid registrations and inspecting life-saving devices to assure they are the proper size and in serviceable condition.

Visit the N.C. Wildlife Resources Commission's web site.
http://www.state.nc.us/Wildlife/

Night Musician

The old saying "It's better to be seen and not heard" probably doesn't apply to tree frogs. We hear them, with pleasure, but seldom see them. Well, no wonder when they are as well camouflaged as this gray tree frog. For more on these increasingly threatened amphibians, look for David Lee's article, "Frog Nights," inside.

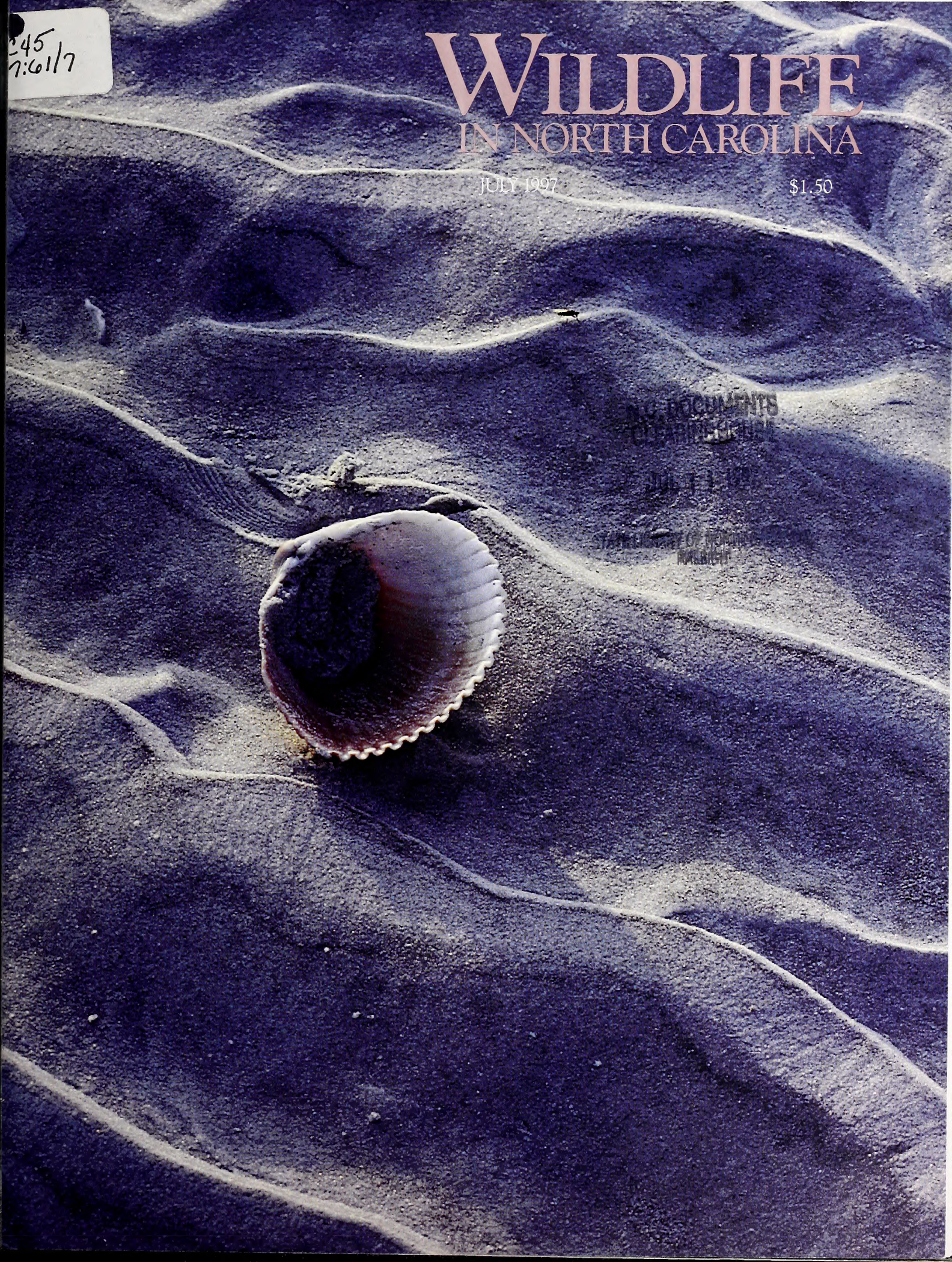
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

S45
7:61/7

WILDLIFE IN NORTH CAROLINA

JULY 1997 $1.50

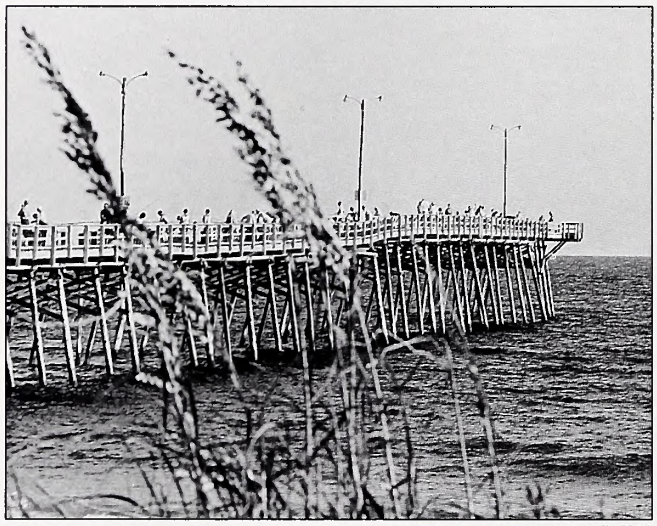


DOCUMENTS
JUL 1 1997
STATE LIBRARY OF NORTH CAROLINA
RALEIGH

Saying Goodbye to a Landmark

by Jim Dean

"It was such a strange feeling to drive up to the Emerald Isle Pier," my son Scott told me after he and some friends had made a spring trip to the beach. "I had heard rumors that it might be taken down after Bertha and Fran destroyed most of the pier last summer, but it was still a shock to find so little left. Even the tackle shop and lunch counter were gone. I guess I had hoped that somehow it might be rebuilt."



JIM DEAN

We talked for awhile about memories associated with the pier. Scott has been fishing the pier since the mid-'70s, while I first fished there in 1960 after Mom and Dad built their cottage about 2 miles west of the pier. Beach property wasn't in great demand—memories of Hurricane Hazel were still too fresh—and you could take your choice of ocean front lots at $3,000. Not only were there no other cottages in sight, there were no cottages whatsoever for 8 miles to the inlet except right at the Bogue Pier—the two-lane blacktop ended just past Bogue at the ferry slip on the soundside. In fact, except for the tiny village of Salter Path, there wasn't much but beach and maritime forest all the way back to Atlantic Beach.

We walked for miles along deserted beaches, exploring the dunes and shell-scattered washes behind the beach and the untouched maritime forest still farther beyond. There was no trash, no sign of man except for the occasional weathered board or sand-blasted bottle.

But it was on the Emerald Isle Pier that I spent most of my time in my late teens and early 20s. In those years when Earl Thompson owned it, it was a steel girder pier much longer than in more recent years after it had been nibbled by various storms, and most of it had been replaced by wood pilings. Fishermen came over from Cape Carteret by the ferry or, more likely, drove out from Atlantic Beach. Except for the rustic Emerald Isle Motel (replaced by condos some years ago), there was nowhere to stay, and many people slept in their trucks or rented one of the trailers clustered at the pier.

"You could find the same people fishing the pier every trip, and all of them became part of a vast extended family."

You could find the same people fishing the pier every trip, and all of them became part of a vast extended family. Fairly early on, Ken Heaverly and his wife bought the pier, and through the 1960s, '70s and '80s we all watched our kids grow up while we float-fished for king mackerel off the end, plugged for blues and Spanish, or fished inshore for flounder, pompano, spots, sea mullet and other species. Fishing was good and the only time the pier was truly crowded was in the fall when the weather was crisp and the schools of bait were heading south. You came to know that certain look when the autumn water had a brisk green chop and bait glittered underneath. You knew fishing would be peak for just about everything worth catching, and farm families would bring lard stands and fill them with spots. Scott, my brother, John, and I would often fish on the pier from dawn to dark for a week or more, losing all track of time.

Although the fishing has been poorer in recent years and some old friends are long gone, lots of people are going to miss this place.

"It was the first stop on nearly every trip, even sometimes before we bothered to unload the car," Scott recalled. "Couldn't wait to find out what was biting. I caught my first Spanish mackerel and bluefish on plugs there when I was very small. I loved to drag minnows or stripbait around the pilings for flounder. Something interesting was always happening. It seems only a year or so ago that I hooked a king on a plug and lost it around the pilings.

"I still catch myself thinking I can go up and plug for an hour or two for Spanish mackerel after supper as I always did. Or go buy a hamburger and a drink and just hang around and talk to someone while they watch their rods. There are other piers, of course, but it won't ever be the same.

"You know," Scott added. "I noticed that the sign for the pier was still out at the road. I had my picture taken standing under it."

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John E. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jim Bennett/Greensboro
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

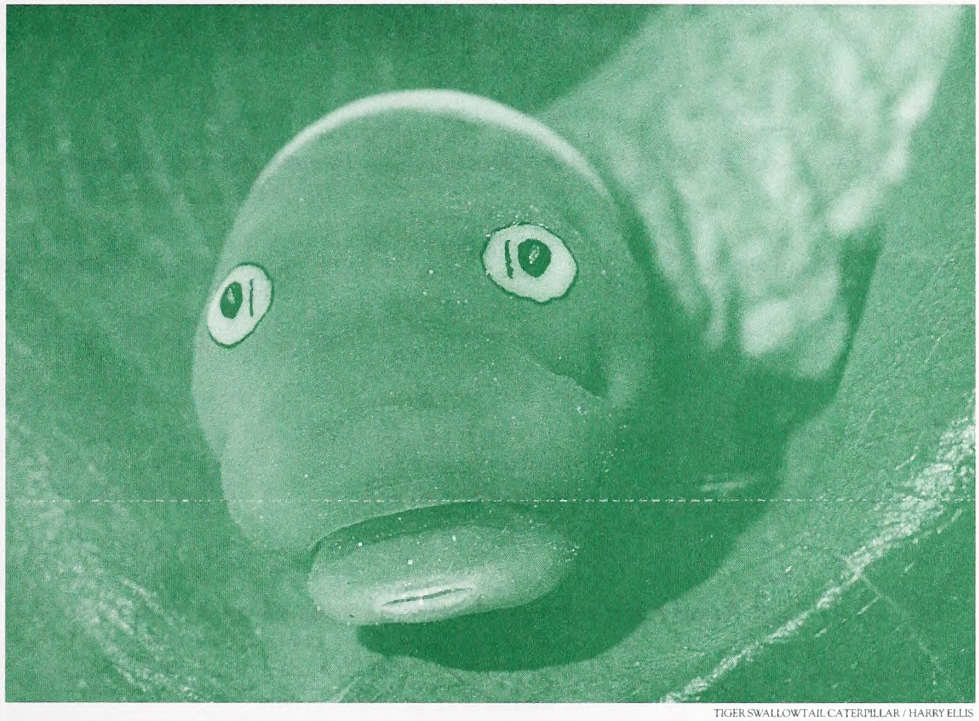
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants



TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, in October we'll include a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS ☞

MAGAZINE SUBSCRIPTION ORDER FORM

SUM97

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.** *(If renewal, attach recent magazine label.)*

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
first name MI last name area code

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** **$**

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** **$**

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** **$**

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE ( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

CONTENTS

WILDLIFE IN NORTH CAROLINA

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

July 1997 *Volume 61, Number 7*

FEATURES

page 17

4 **Terrestrials Revisited**
written and photographed by Gerald A. Almy ©1997
The value of trout flies tied to imitate land-dwelling insects was established years ago, but many fishermen still don't realize that these flies work nearly year-round.

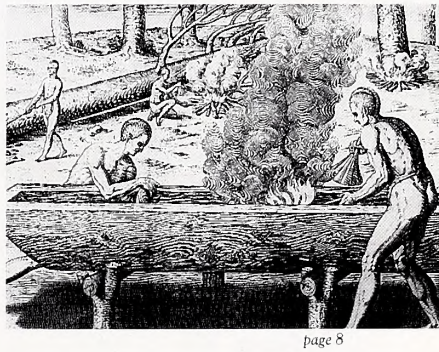
8 **Boats That Fit** *written by Ted Dossett*
From the earliest dugouts, boats that were designed and built for North Carolina's inland waters reflected their historic use. Many were fishing or net boats; some were little more than crude ferries.

14 **N.C. WILD: Don't Teach Without It**
written by Celeste Wescott-Maus / photographed by Ken Taylor
N.C. WILD is more than just a tool for teaching ecology and the dynamics of wildlife in their natural habitats. It's also helping students succeed in countless other subjects including reading, math, art, biology—you name it.

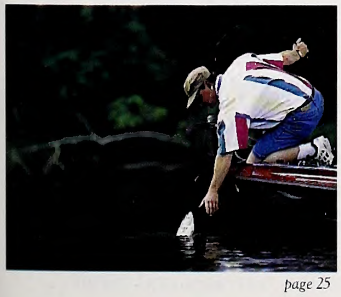
17 **Treasures in Trust** *written by Gina Rutherford*
photographed by Ken Taylor
In its 10-year history, the North Carolina Natural Heritage Trust has provided more than $27 million to save thousands of acres of the state's most significant natural and historical places for future generations. Here's what the program has done so far to protect some of North Carolina's priceless treasures.

25 **Pinpointing Pressured Bass**
written and photographed by Mike Gaddis ©1997
Largemouth bass populations are in good shape thanks in part to catch and release, but intense fishing pressure can push them out of popular "honeyholes." That's why you need to learn to find and fish less obvious, secondary structure.

30 **Certify That Trophy Fish** *written by Keith Ashley*
Caught a really nice fish? Want some recognition for it? Now, thanks to the N.C. Angler Recognition Program (NCARP), you can apply for a certificate for those trophies that exceed certain minimum weights.



page 8



page 25

DEPARTMENTS

Our Natural Heritage *by Jim Dean*
Nature's Ways *by Lawrence S. Earley*
Back Porch *by Rodney Foushee*
Wildlife Through the Year *by Rodney Foushee*

Cover *An Atlantic cockle on a wave-swept tidal flat. Photographed by Jack Dermid* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

After the Storm: Wood Decay

written by Lawrence S. Earley
illustrated by David Williams

What's happening to all the trees that Hurricane Fran blew down? Many have been cut, chipped, removed or otherwise used by humans, but thousands more still lie in the woodlands of North Carolina awaiting nature's finishing touches. Don't worry—she's up to the task. Soon nothing will be left of those 80-foot tall, 30-ton veteran oaks or pines except a few handfuls of mushy, rotted wood.

How do trees that big disappear? Indeed, the cast of characters involved in wood decay is exceptionally large and they occur in succession. That is, many of them prepare the way for each other. The most important of these organisms are wood-decay fungi whose reproductive bodies appear on the outside of the tree or grow in the soil, some of them familiar to us as mushrooms. The fungi themselves consist of microscopic, threadlike hairs called "hyphae" (plural) that snake through wood and snack on the minerals and nutrients inside. Only fungi have enzymes that can break down the tough cellulose and lignin chemicals that make up the cell walls of woody plants.

Some fungi, known as heart-rot fungi, may have already been present in the *living* tree as parasites, growing along the roots or in a wound and chiefly attacking the heartwood of a tree. Sap rots or slash rots attack mainly the sapwood, and eventually the heartwood, of a *dead* tree and are known as "saprophytes." Both of these kinds of wood-decay fungi perform their work in similar ways. To gain entrance to the tree's interior and its rich food resources, both must find the door—a wound in the bark that exposes the tree's wood. A bear clawing a tree can create such a wound. So can insects, birds, wind, ice, lightning and the careless operator of a skidder. There they are joined by hosts of plants and animals that eventually include algae, mosses, lichens, insects, slugs and even small animals, although not all at the same time.

These wood-decay fungi are further subdivided into two groups—white rotters and brown rotters. The brown fungi work first on the cellulose in the wood, leaving a brown residue behind. The white rotters decay the lignin in the wood first, leaving behind a white residue, and eventually decaying all the wood.

You can tell when a tree is rotting by the characteristic spore-producing structures that grow on the outside of the tree. In many cases they look like brackets or small shelves. These reproductive structures are loaded with spores, their genetic lifelines. How many spores? Let's put it this way—at any time, the forests are awash in spores from fungi. Researchers have found that a single fruiting body of a particular species may produce as many as 4.65 billion spores in a day. Another has been found to produce 20 million spores a minute, and it can keep up this incredible output for five months!

With so many trillions of spores floating through the forest like dust motes, no wonder it takes just a little while for a tree with a break in its bark skin to be colonized by fungi. Of course, a living tree has defenses of its own and can put up an effective resistance to these invaders, often overcoming them. But for the toppled giants killed by Fran, it's only a matter of time before the tree is colonized and decomposes entirely.

In the colder regions to the north, decomposition can last a century or more. But in the humid and moist South, decay requires no more than a few decades or less, depending on the amount of moisture available. Indeed, the presence of moisture is the key to fungal colonization in wood, and to the decay process.

Once the white and the brown rots have softened the wood, beetles, termites and other small wood-boring animals can perform their homely tasks, taking up residence in the wood and feeding on it.

Fungi are nature's great recyclers, liberating the nutrients contained in dead trees for use by other plants and animals. If not for them, and for the valuable recycling services they perform, our woods would be inhospitable to life.

Other Reading

- Gary Lincoff, *The Audubon Guide to North American Mushrooms* (1995).

Surfing the Web

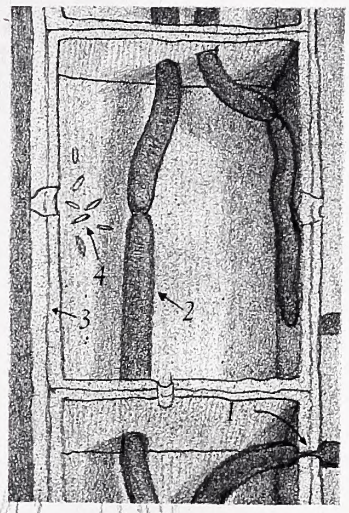
- Also look at The World Wide Web Virtual Library on the subject of mycology (the study of fungi) which gives many other linkages. *Address:* http://muse.bio.cornell.edu/~fungi/
- The Museum of Paleontology at the University of California, Berkeley provides a well-prepared introduction to the kingdom Fungi. *Address:* http://www.ucmp.berkeley.edu/exhibit/exhibits.html
- Course in Forest Pathology at State University of New York, College of Environmental Science and Forestry. *Address:* http://149.119.6.124/course/jworrall/decays.htm

Observations

Look for fallen logs and observe the wood-decay fungi. How many kinds of reproductive bodies can you find on the tree? Are the fungi on the branches different from those on the trunk?

Wood-decay is a process that *liberates nutrients trapped in dead wood for uptake by other plants or animals. Fungi play a lead role in this decomposition process, ensuring that nutrients are recycled.*

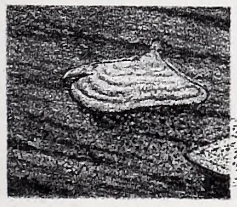
Wood decay begins *when a hairlike strand of the fungus breaks through the wood cell wall (1) and begins to digest the internal contents of the cell (2) and eventually the cell wall (3). Also competing for the nutrients are bacteria (4) which have entered the cell.*



downy woodpecker

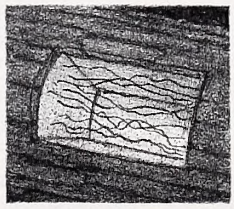
bull snake

opossum

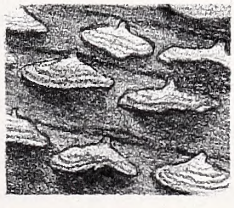


Spores released from a fungal fruiting body growing on the outside of a tree . . .

. . . land on a tree's open wound. . .



. . . and infect the tree with hyphae . . .



. . . which raise other fruiting bodies.

Millions of spores from a single *wood-decay fungus may pour from its reproductive body. These innumerable spores are carried by breezes through the woods where they inevitably—and quite by chance—germinate on the exposed wood of a tree that has been wounded. The hairlike hyphae enter the wood cells and in time develop their own reproductive bodies.*

Terrestrials Revisited

The value of trout flies tied to imitate land-dwelling insects was established years ago, but many fishermen still don't realize that these flies work nearly year-round.

written and photographed by Gerald A. Almy ©1997

From spring through fall, terrestrials are the most important trout foods that anglers in North Carolina should imitate. That may come as a surprise to many who believe flies that imitate land insects are primarily effective only in the summer. However, as the first warm, sunny days begin popping up amidst those cold, gray, nasty ones in March, ants, beetles and other land-borne insects begin emerging from nests,

***Though this** carefully tied replica of a ladybug shows off the fly-tier's art, it isn't necessary to go to that much trouble. Most any fly that looks like a beetle, ant, hopper or other terrestrial will catch trout—often when patterns that imitate aquatic trout food fail.*

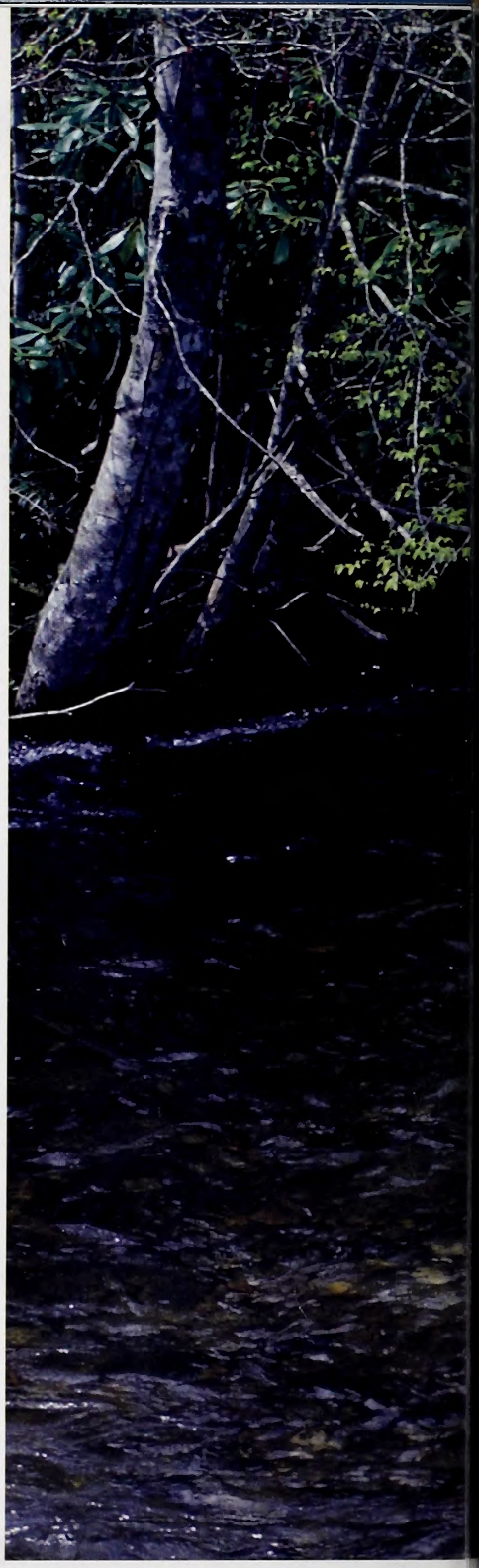
dens and crevices in logs and hustling about. Once that activity commences after a few days of temperatures in the 50s and 60s, it doesn't take long for some of these insects to hop, stumble or get blown into the water. When that happens, land insects are quickly converted to trout food by hungry fish eager to start their spring feeding.

The importance of these insects as trout food will continue to increase as days become longer and warmer, reaching a peak in summer. But terrestrials don't disappear after that. They remain available to trout and offer good fishing right through fall—indeed, so late that when deer and grouse seasons come in, it becomes a difficult choice whether to pick up a bow, gun or fly rod.

I've been fascinated by terrestrials as a trout food ever since I first began fishing the streams of the Appalachians and Blue Ridge as a teenager, then broadened my experience by venturing north into Pennsylvania and eventually out West, as well. In fact, I became so intrigued by them that I wrote a book about the subject—*Tying & Fishing Terrestrials* (Stackpole Books, 1978). It's a testimony to the effectiveness of these patterns and their importance in the diet of trout more than to my writing skills that this book is still in print, nearly two decades later. Another popular book has also been written on the subject—*Terrestrial Fishing*, by Ed Koch, also published by Stackpole—not to mention countless magazine articles and chapters in other books.

In fact, as the years have gone by and aquatic hatches have grown sparser on many streams, the various terrestrials have become even more important. Before going any further, let's define "terrestrial." Basically, a terrestrial is an insect—or an artificial fly imitating an insect—that is born and lives on land. These include ants, beetles, leafhoppers, treehoppers, caterpillars, crickets, grasshoppers, bees and many others. Entomologists say there are close to a million different species of land insects. The beetle order alone (Coleoptera) includes more than 300,000. Land insect species outnumber aquatics such as mayflies and caddis flies by 20 to one.

What is it that makes these foods so important to trout? Their sheer abundance is certainly one factor. There are literally millions of these insects along all trout streams



in North Carolina, and that means quite a few of them are going to wind up in streams. There, the surface tension of water is very strong. It acts like a trap, and virtually none of the hapless insects escape.

It doesn't take trout long to realize that these land insects represent a steady source of food virtually all year long. This is one food the trout know they can count on, and they feed on them readily whenever they enter the water.

The fish seem to learn quickly that unlike a mayfly hatch—which is short, but

intense—terrestrials will dribble in sporadically, but abundantly, all day long, and they represent a high-protein food source the fish simply cannot ignore.

Land insects don't attract only small trout, either. They seem especially effective at luring big fish topside. Most of the largest trout I've caught on surface offerings over the years have come not on mayflies or caddis but on imitations of beetles, crickets, ants, grasshoppers and the like. It doesn't take a trout long to learn that chunky beetles or hoppers will fill its belly far more quickly than tiny sulphur duns. And perhaps because of this, terrestrials work many times when they shouldn't.

More than once I've fooled a stubborn fish in the midst of a blue-winged olive or midge hatch by plopping a fat beetle or a succulent black ant among the aquatic insects. Certainly it's more fun to try to match the hatch, but if this traditional approach doesn't work, tie on a terrestrial. Furthermore, for the 80 to 90 percent of the time you're on the water when nothing much is hatching, terrestrials are by far the best choice for surface action.

Terrestrials are especially important on North Carolina and other southern trout waters, since most Appalachian and Blue Ridge mountain streams are on the acidic side, fairly low in fertility, with sparse aquatic hatches.

You can delve as deeply or as lightly into the entomology and life habits of terrestrials as you like. Basically, five orders are of major importance to the angler. These include the Hymenoptera (ants, bees and wasps), Coleoptera (beetles), Orthoptera (grasshoppers

and crickets), Lepidoptera (butterflies and moths), and Homoptera (leafhoppers). Ants, bees, wasps, beetles, grasshoppers, crickets and leafhoppers are most important to trout during the insects' adult life stage. Lepidoptera are consumed primarily during the insects' larval stage, when they are caterpillars.

Sometimes one of these land insects may be more prevalent along a stream than the others, and it never hurts to do some searching along the shore to see which is most abundant. Streams with forested borders are likely to hold ants, beetles and caterpillars. Grassy meadow stretches often hold crickets, grasshoppers, leafhoppers and ants. Time of day can also influence which pattern you choose. Crickets, for instance, are most active at dawn and dusk, grasshoppers during midday.

But while it's important to consider these external clues before choosing a fly, seldom does it boil down to finding the *one* terrestrial that will work. Usually several patterns will produce over the course of a day, since the fish are used to seeing a variety of land insects dribbling in.

The trout in most southern streams simply can't afford to be picky. If a grasshopper floats by, trout know they need the calories and must grab it. If a leafhopper or caterpillar comes by the next minute, chances are good they'll nab that, too. I had this demonstrated to me recently on the Nantahala when over the course of one afternoon I took fish on beetles, ants and cricket patterns.

While one could carry literally hundreds of different patterns to imitate land insects, you can simplify things and still catch plenty of fish. Carry a selection of seven terrestrials and you'll be set to take fish in virtually any stream in North Carolina.

These can be tied of fur, feathers, cork, balsa or the most recently popular material—closed-cell foam. All of these materials work well for terrestrials. I usually stock a variety of them because fish in some streams will strike a cork beetle, for instance, while those in the next one might prefer a foam, deer hair or fur pattern.

For a basic North Carolina terrestrial selection, here are the flies I recommend: black beetles, sizes 10 to 16; cinnamon, orange and black ants, sizes 12 to 18; black and yellow bees, sizes 8 to 12; tan or yellow grasshoppers, sizes 8 to 12; black crickets, sizes 8 to 12; green and yellow caterpillars, sizes 6 to 10; and brown leafhoppers, sizes 16 to 20. If you want to carry even fewer flies, you can skip the leafhoppers and bees, narrowing the selection to five types of patterns.

Tackle should be kept light for terrestrial fishing. I use 5X to 7X tippets with leaders of 9 to 12 feet. Line weight can range from 2 to 6, double taper or weight forward. Rod length, though, is more problematic. For headwater streams where room for backcasts is limited, I often choose a 7- to 8-foot rod. For more open streams I'll go with a 9 footer. The longer rod is also excellent for dapping, or reaching out with the rod and dimpling the fly on the surface.

Besides light tackle, the low, clear waters found when terrestrials are abundant also require a cautious approach to the stream. Dressing in drab, or even camouflaged, clothing helps. I also like to keep a low profile, creeping hunchbacked to the water, often getting down on my hands and knees to crawl into casting range if the water is espe-

***It may not look** like an ant to you, but floating in the surface film of the water, this fur-bodied pattern looks like an ant to a trout.*

cially low and the fish skittish.

Work on the trout at the tail of the pool first, to avoid spooking them with your cast and causing a chain reaction that puts all the inhabitants of the pool off their feed.

Delivery of terrestrial patterns should mimic the way naturals enter the stream. Bantamweight insects such as leafhoppers, small ants and tiny beetles settle onto the stream like fluffs of dandelion. They seldom make enough noise on impact to draw the attention of the trout. Because of this, the fish use sight as their primary sense when feeding on these lightweight insects.

Take your cue from this and deliver imitations of these tiny insects as delicately as possible. Cast them 2 or 3 feet above the fish and allow them to drift down drag-free over the quarry. When you see fish rising but don't see any specific hatch coming off, this is the technique that is most likely to produce. On Big Santeetlah Creek one day this tactic and a good supply of ant and leafhopper patterns produced more than two dozen wild rainbows for me, as well as one brightly-colored brown.

Another kind of terrestrial fishing is quite different from this gentle angling, but equally fascinating. Loud, boiling rises are the tip-off to this type of fishing. Almost without exception, these rises are caused by trout feeding on heavier terrestrials such as beetles, carpenter ants, cicadas, crickets, caterpillars or grasshoppers.

These larger, heavier-bodied creatures are dense and compact and many of them make a distinct "splat" when they land on the water's surface. Mimicking the noisy entry of these insects into the water can yield some spectacular fishing. The flies used to imitate these large terrestrials are made of dense materials such as cork, balsa, packed deer hair or foam, so driving them onto the water with a slightly overpowered forward stroke of the rod, or stopping the cast high above the water, gives the splat you want. Be careful, though. You don't want your line to slap down onto the water; only the fly should land with a light "plop."

If a trout is within range where it can hear or sense the fly's entrance, a broad wake will likely furrow the water as the fish swims over to examine your offering. I've had trout swim 15 feet to inhale large caterpillars, beetles or crickets slapped down onto the surface in this manner. The suspense can be taxing on your nerves as you watch a fish cruise over and examine the fly. Control your instincts, though. You don't want to set the hook until *after* the fish clamps down on the offering.

One trick that I've found useful when employing this "sound cast" is to drop the fly 12 to 18 inches to the side or slightly behind the trout's holding position. This keeps your leader out of view of the fish and also tends to take the fish by surprise. Often, the trout's response will be to whirl around, race to the fly and slurp it down.

Whether you delicately drift a tiny ant or leafhopper over a dimpling trout or plop a chunky deer hair beetle down with an audible splat, don't overlook the terrestrials. They can provide some of the most reliable and satisfying fishing of the year on North Carolina streams. And they shouldn't be relegated to "summer only" status. They're good from the first warm days of March until the sharp frosts of November. ☒

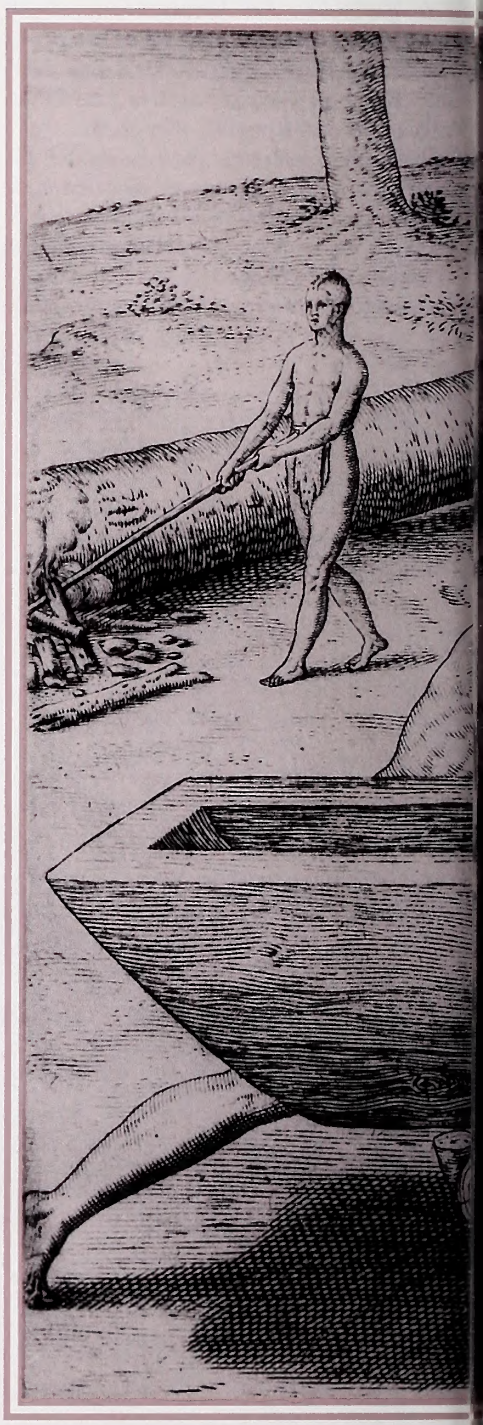
***A wide variety of** terrestrials will work for trout from early spring through late fall because many of these insects fall into the water. Grasshoppers and crickets (top) are excellent choices, and so are (left to right, bottom) black ants, beetles and, at times, inch worms.*

***Fly patterns that** imitate ants are particularly effective. Patterns are constructed of a wide variety of materials. These are floating patterns tied of deer hair, foam, painted cork and fur. Though real ants don't sink, sinking ant patterns can also be effective.*

Boats That Fit

From the earliest dugouts, boats that were designed and built for North Carolina's inland waters reflected their historic use. Many were fishing or net boats; some were little more than crude ferries.

written by Ted Dossett



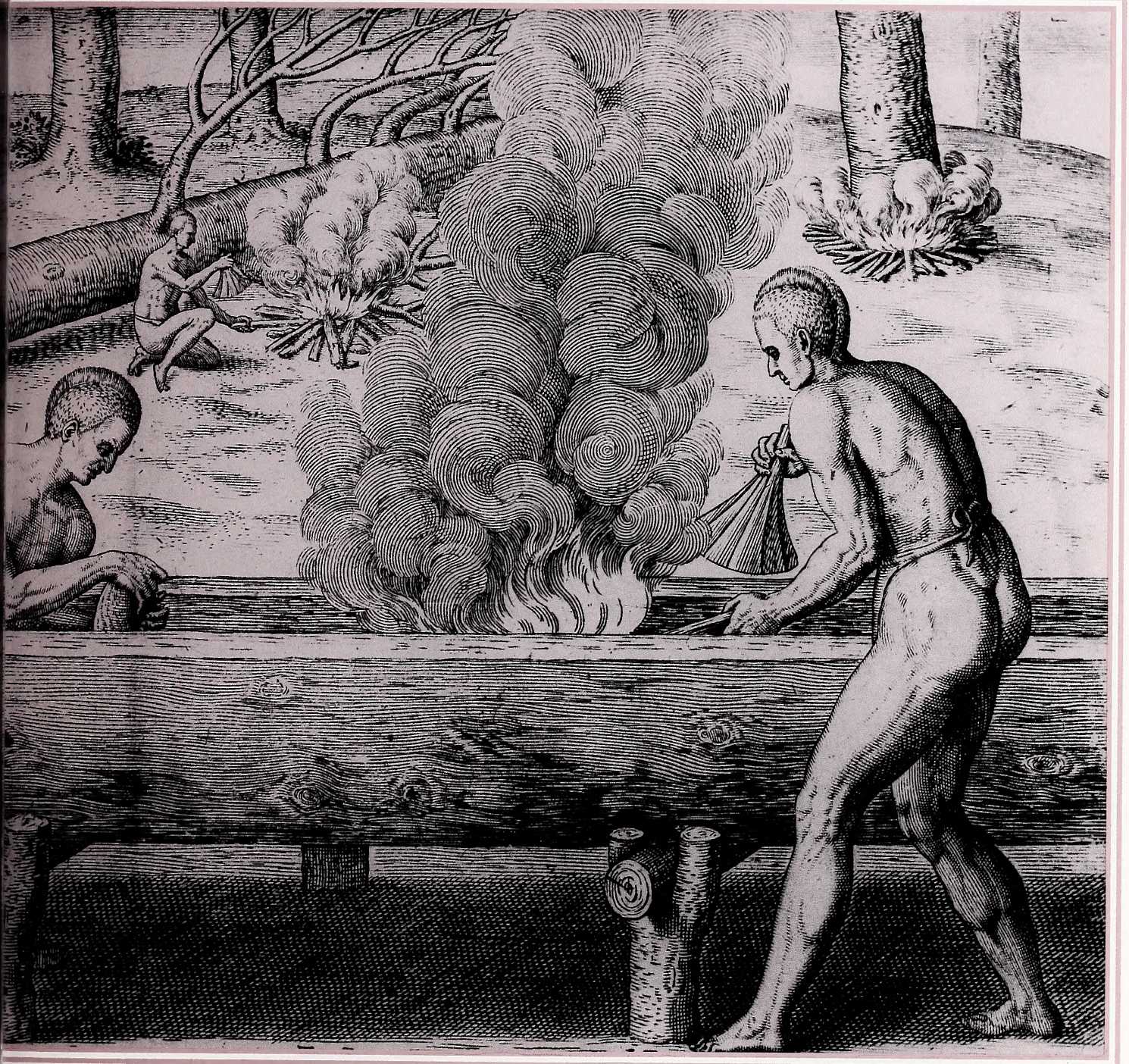
It was propelled with the slightest thrust, the paddle seldom lifted clear of the water. It barely pushed a ripple as it slipped silently between the massive trunks of the cypress trees. And from the distance the paddler seemed to squat on the water, almost motionless, yet moving steadily across the calm surface.

A man in a boat—a scene that has been repeated countless times on the waters of eastern North Carolina. The craft is a wooden dugout and the paddler first an Indian, then, reaching well into this century, the white man who replaced him.

***These wooden** dugouts were fairly typical of many utilitarian boats adapted from the native Americans and used along the waterways of North Carolina from the earliest times. Though their construction was labor intensive, materials were free, the shallow-draft boats could go virtually anywhere, and they lasted for years.*

The dugout was first made several thousand years ago by the Indians of the Southeast and is a classic example of form follow-ing function. With its low profile and maneu-verability, and silent, almost effortless paddling, it was a superb hunting craft. A skilled paddler could easily work a dugout into bow range for a shot at a deer, bear, duck or other quarry that inhabited the swamps. It was equally suited for fishing, and perhaps somewhere in time that match of boat to environment even made it possible to surprise an enemy.

The one-man dugouts were used primarily in the sheltered waters of the swamps and smaller rivers; the teeming fisheries of the sounds and larger Coastal Plain lakes called for larger craft. In fact, a lot of time must have been spent sitting around the campfire 3,000 years ago as the Indians burned out the 37-foot-long specimen that



***This well-known** early engraving from the Roanoke Island series by John White shows native Americans "digging" a dugout with the help of fire. By burning and scraping, they were able to make a shallow-draft boat from a single log.*

was retrieved from Lake Phelps. And they didn't just hollow out the boat by burning; fire was also used to fell the tree and burn off the branches. That's understandable considering the Indians had no metal tools. Even stone for scraping out the charred wood was scarce in the sandy coastal soil.

As labor intensive as they were in the making, the dugouts served the Indians well, enabling them to efficiently harvest the wildlife resources of their environment. At the same time, their construction was of readily available materials such as cypress, white cedar and probably even longleaf pine.

The dugout was only the first of a number of craft that have evolved on North Carolina's rivers. And although, after thousands of years, they were still being "dug" well into this century, the original dugout has gone through many design modifications, until today it is even being molded from ABS plastic. But the period between those first dugouts and their plastic descendants saw the development of a variety of boats indigenous to the larger streams and rivers. Like the dugout, they were designed to fit the demands of the environments in which they were used, whether that meant poling upstream through heavy rapids or ferrying

across the river to a farm field. And from the beginning, a major function of these "woodland" boats was to take advantage of recurring biological events, in particular the annual spawning runs of fish.

It's certain that the first settlers quickly put the dugout to their own use in roadless eastern North Carolina as rivers became major transportation routes. But even as river transportation declined in importance because of 20th-century road building, the spring spawning runs of herring, shad and striped bass continued to draw men to the rivers. They were drawn as late as the latter 19th century by an abundance of striped bass, shad and herring that is unimaginable today. One report from the mouth of the Roanoke tells of a single haul of 820 stripers weighing 37,000 pounds—that's an average weight of 45 pounds per fish. Another haul of 600 fish taken near Edenton reportedly averaged 80 pounds each.

The western end of Albemarle Sound is fed by the Chowan and Roanoke rivers, and it is up these rivers that the striped bass, shad and herring make their ancient spawning runs. On the Roanoke, striper spawning has historically been concentrated in a reach several miles above and below Weldon. Here, again, form followed function in the design of boats.

Along the Roanoke River at Weldon, and throughout much of the eastern Coastal Plain, the boats that were predominantly found through the 1950s were mostly hand-built wooden skiffs. Boards were used early, and later plywood. Farther east, juniper (Atlantic white cedar) was the most common wood, especially because it resisted rot.

Sterling Keeter of Weldon, a legendary observer of the Roanoke for more than 65 years, says the early boats were long and narrow, "18 to 25 feet long and about 30 inches wide. They made 'em long so the bows and nets could lay on 'em, you understand. They drifted down the river, but they didn't drift far at first because they didn't have no way to get back."

N.C. WILDLIFE RESOURCES COMMISSION

The drifting Keeter refers to was a simple fishing technique called "bow netting." Using long-shafted bow nets that sometimes reached 25 feet in length, two and sometimes three netters would hold the nets vertically just off the river bottom as the boat drifted downstream. A paddler kept the boat crosswise in the river and held a drift slightly faster than the current on the bottom so the net would actually be bagged upstream. The stripers, on their way upstream to spawn, would be quickly hauled in as they struck the nets. Most of the fish were sold locally, but many were shipped to markets in Washington and Baltimore.

There were other valuable fish to be taken from the Roanoke, such as the white shad, which was highly prized for its roe. But the striped bass, or "rock," as it is often called, was prized for its flesh as well as its eggs. Around 1885, a state-run striped bass hatchery at Weldon was transferred to the U.S. Bureau of Fisheries, which began buying striper eggs from the local fishermen. The practice continued for several decades, and, according to Keeter, it brought welcome income for the cash-poor economy of the time. "In the late '20s my brother and I caught a rock that brought us $80 for the eggs. That was *money* back then."

Downstream from Weldon the Roanoke was flat water, but upstream, before the construction of three major dams covered them, powerful rapids made the river unnavigable for most boats. But stripers were spawning in those rapids, and men were bound to catch them. The design of the long, narrow boats enabled them to do so. In the hands of a skilled boatman, they were poled or paddled through the turbulent rapids that stretched for miles above the Weldon pool. It took skill and strength, and it was dangerous, but they went, challenging the river not just for the spawning fish but for the wild turkey and waterfowl to be found among the islands carved by the river.

Wallace Mitchell, 72 years old and another longtime observer of the Roanoke, reflected on the skill of these river men and the respect they were accorded. "My wife's daddy was the best I ever seen polin' or paddlin' up the rapids," he recalled. "He'd go up there to tend his fish slides [traps] and hunt too." And, Mitchell added, they would even use bow nets as they drifted down through those rapids, one man paddling and the other handling the net. "It took a real man to handle those long-handled bow nets."

The coming of motorized boats in the 1920s began a succession of major changes in fishing techniques and in the design of the riverboats. Along with the traditional riverboats, there were now more conventional boats with pointed bows and outboard motors that allowed the netters to make more and longer downstream drifts.

In the 1950s, increasingly powerful motors gave the netters the speed to reach the "rock fights" that occur frequently during the spawning season. During a "rock fight," a female, or roe, striper is surrounded by male, or "buck," stripers literally fighting for the chance to fertilize her eggs. Often this struggle occurs on the surface and may last for 20 or 30 seconds.

The new fishing technique of "running rock fights" led once more to major changes in boat design. Again, necessity resulted in a craft built for speed—14 to 16 feet long—and wider, with a blunt bow and deck upon which the netter perched to make a high-speed scoop of the fighting fish. The traditional cypress and juniper were replaced by marine plywood as the favorite boat-building material. Even the bow nets were shortened to 6 or 8 feet for quicker handling and because most of the netting was now done on the surface.

But as frequently happens, this new technique led to overkill, and the bow netting of stripers came to an end. The rapidly escalating price of striped bass—from 25 cents to $3 a pound in a few years—attracted so many fishermen that it was feared spawning would be disrupted and the striper population damaged. In 1981 the time-honored tradition of bow netting was banned on the Roanoke River.

Farther south, on the "skimming grounds" of the Neuse River, men and boats also waited eagerly for the hickory and white shad to begin their spring spawning run. Their technique might have differed from that used by their Roanoke counterparts, and their long, narrow boats may not have been as elegant, but they served the same purpose. Admiral Howell, for over 30 years a wildlife officer in Wayne and Johnston counties, recalls the spring of 1949, when he began work with the N.C. Wildlife Resources Commission. "There were 75 boats down there on the river," he said. "The boats averaged 15 to 16 feet long and had a beam of about 3 to 4 feet—and they were built of most anything. If he was a dyed-in-the-wool 'skimmer' and took a little pride in his boat, he would use cypress or white cedar [juniper] if he could find it. Tenant farmers, they'd find straight-grain pine, slash pine, and chink it with tar. They were all homemade boats."

Historically, the Neuse never hosted the vast spawning runs of striped bass that the Roanoke did; rather, it was hickory shad and the white shad and its roe that the fishermen sought. "From the Cox's Ferry bridge to Quaker Neck was what we called the main skimming ground," said Howell. "They called it 'skimming for shad' because they didn't hold the net so deep, and they'd make two or three drifts and then paddle back up. They'd drift parallel to the bank—they knew where the fish were. There was a string tied to their finger that went to the center of the net, and it would send a message. As soon as they felt it, they would pry up on the net, all in one motion, and the fish would trail right in the boat. Once in a while you'd see a motor, but they were few and far between. They'd paddle right up against the bank. It took some manpower to paddle those boats, and for that reason the boats were long and narrow and not too wide."

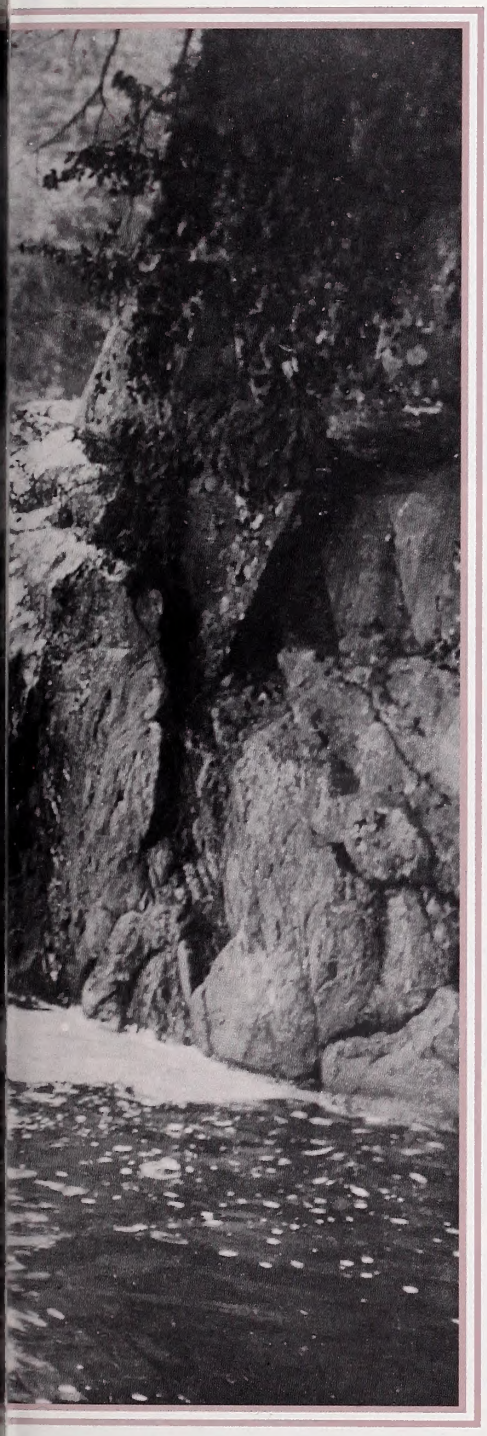
By the late 1960s, the fishery was about gone and the boats with it. "Some of the old timers faded away, and the younger generation didn't seem to be that interested—factories, tractors," recalled Howell. "People

This old photograph *taken about 1910 on the Linville River shows a typical crude utilitarian boat used to ferry rivers or to fish. These boats were particularly common in the western part of the state, and were no doubt prototypes for the modern johnboat.*

moved to town. Then in the late '70s, there was not a single boat down there."

While the rivers and streams of the mountain valleys never experienced the dense spawning runs of the coastal and Piedmont rivers, there still was a need for boats. And, because they served primarily to ferry across the shallow rivers, they were of the simplest design. However, the idea that simplicity is beauty quickly falls apart in these craft. They were called "slab" or "board" boats, a title that more than aptly describes their appearance. Like the shad "skimming" boats of the Neuse River, they were built of whatever materials were handy, which usually meant rough-sawn pine or oak boards. Construction was as simple as the design. The sides and bow and stern —usually two boards tall—were simply nailed together into a rectangle. Boards were then nailed across the frame to form the bottom. Another piece of board was nailed to the tops of the sides or gunwales, if you could call them that, to make a seat. There was some rake to the bow and the stern, but the final product was a craft about 12 inches deep, 3 feet wide and usually 12 feet long, bearing a striking resemblance to a mortar box.

Of course, there were variations on this



simple theme. Some boats had a bit of taper to the bow, and screws were sometimes used instead of nails, as was tongue-and-groove lumber. Paint was optional—most often being omitted—but the boats were caulked with a tar product called Black Mammy. It never hardened, but the craftsmen got around this sticky problem by laying a piece of old tent canvas over the tar.

According to Jan Davidson, director of the Campbell Folk School in Brasstown, even as late as the 1950s there were board boats lying on every bank. "People would build the boats and add them to the pool," he said. "They didn't really belong to anyone, and anyone could use them—[they were] never locked up."

And there was good reason why the mountain folks kept on building boats every year, even hinting at an early version of the treasured American concept of "planned obsolescence." Davidson recounts the explanation given him by an old mountaineer: "The first year these boats were built, they weighed 200 pounds; the second year they weighed 400 pounds. They weighed 800 pounds by the next year, and after four years they were on the bottom of the river. They just kept soaking up water and getting heavier and heavier."

***This fishing party** shown in this photograph shows a crude boxlike boat made of rough boards with simple seats nailed across the gunnels. About all you could say about it from a nautical standpoint is that it served its purpose.*

Still, these homely craft served to ferry the mountain folks across river and creek to their farm fields and pastures. Sometimes a homestead didn't have a bridge across the creek, and the only way anyone could reach the road on the other side was to ferry across in a slab boat. The boats were also used for fishing, running trot and trap lines, checking catfish baskets, frog gigging and even collecting fish stunned by dynamite tossed in the deeper holes on the rivers.

It is still possible to see an occasional slab boat resting on a riverbank, but times and the rivers have changed. Bridges cross streams and rivers to the green of fairways, not pastures. And cornfields now sprout second homes whose picture windows gaze down upon mountain rivers bristling with the bright yellows, reds and blues of kayakers, canoeists and rafters.

The old way of life along the rivers has vanished, and the boats that supported it rot along the banks or in the silt of a thousand streams and rivers. No longer are there needs for boats to ferry across rivers or for skimming shad. Dams and reservoirs have cut deeply into some of the great spawning runs of the past. Pollution from countless different sources has also taken its toll.

But as the saying goes, the more things change, the more they stay the same. What began as a cypress dugout, hollowed with fire and scraped by stone, has become a canoe or kayak made of molded cross-link polyethylene. There also has been a huge shift in function, moving from the simple slab boats that once ferried farmers across the rivers to the high-tech 20-pound craft used along those same rivers in 1996 Olympic competition. Yet, they're still river boats designed to meet the demands of their environments. Materials and purpose may seem to undergo random changes, but always there is the connection of form following function, in variations on a theme that began with a dugout. ⊠

All photos courtesy of N.C. Division of Archives and History.

N.C. WILD: Don't Teach Without It

N.C. WILD is more than just a tool for teaching ecology and the dynamics of wildlife in their natural habitats. It's also helping students succeed in countless other subjects including reading, math, art, biology—you name it.

written by Celeste Wescott Maus
photographed by Ken Taylor

What's N.C. WILD all about? To find out, you might attend one of the many N.C. WILD workshops that the N.C. Wildlife Resources Commission sponsors throughout the state year-round. Teachers who just the day before had been warning their students to cut out the nonsense are laughing as they explain their original "bird" designs. One, called the Traffic Cone Bird, is camouflaged to look exactly like a traffic cone. It moves about on the backs of DOT trucks, eats automobile exhaust and seems to reproduce overnight. Another, the Purple Pollution Eater, possesses a bill shaped like a vacuum cleaner that sucks up polluted stream sediments.

Apparently N.C. WILD is all about having a good time, but despite the laughter there's serious learning going on here. This activity, titled "Adaptation Artistry," demonstrates the biological concept of adaptation, the physical and behavioral ways that tie animals to their environments. It's an essential concept in the study of biology, and a requirement of the biology curriculum. But N.C. WILD is taking a very different approach to learning what can be a difficult concept.

"While doing this activity, the students grasp exactly what adaptation really is. The concept 'clicks in' while they combine biology, art, geography and language arts," says Zora Weisbecker, one of eight N.C. Wildlife Resources Commission education specialists who teach N.C. WILD. "The students are also learning cooperatively, sharpening their oral presentation skills, and just plain having fun!"

And the students aren't the only ones to benefit from these activities. "The value of N.C. WILD training became apparent as I observed tremendous growth in my students' understanding of habitats, adaptations of animals, and the effects we have had on the existence of wildlife and our environment," says Beth Ammons, who was first exposed to N.C. WILD while teaching first graders in Scotland County. "But N.C. WILD helped me grow professionally."

Sponsored by the Wildlife Commission, N.C. WILD is a comprehensive educational program that uses wildlife and other exciting, real world examples to support the teaching of reading, writing and mathematics, as well as other subjects including science, physical education, social studies and art. Thousands of North Carolina teachers are finding N.C. WILD a perfect fit with the state's ABC Plan, which was developed by the State Board of Education in response to the General Assembly's directive to accelerate student progress. (The ABCs stand for Accountability, Basic subjects and local Control over educational decisions.) In fact, N.C. WILD fits so well that it has been correlated to subject areas in the North Carolina Standard Course of Study, which identifies what students are expected to learn each year from kindergarten through high school. Teachers are finding that N.C. WILD is just the right tool for helping to move the state's educational system into the 21st century.

N.C. WILD begins with training workshops based on Project WILD, the award-winning, international wildlife, conservation and environmental education program that was created by teachers for teachers. Rather than give teachers something else to teach, N.C. WILD provides them with enjoyable and hands-on ways to do the job expected of them. This is a reason that over 95 percent of the more than 35,000 state educators participating have evaluated N.C. WILD workshops positively. Six- and 10-hour workshops are offered year-round statewide by professional education specialists with the Wildlife Commission's Division of Conservation Education. Workshop participants all are given free program guides and practice using the guide activities, as well as other support materials to explore and explain North Carolina's wildlife, natural resources and natural habitats. Support is also provided for

***While participating in** a popular N.C. WILD activity, "How Many Bears Can Live in This Forest?," these students are meeting science, social studies, mathematics and physical education objectives.*

***Wildlife Commission** education specialist Zora Weisbecker (right) shows a teacher what she can learn from examining an owl pellet. During a N.C. WILD workshop, educators learn first-hand about owls, identify simple food chains and reconstruct prey skeletons.*

action projects, including the development of outdoor projects and sites.

While the primary thrust of N.C. WILD is to support classroom teachers, other educators including resources agency staff, park and nature center staff, college students and youth group leaders all find the program very useful. N.C. WILD can work for everyone.

N.C. WILD is stimulating and easily adaptable. North Carolina teachers are using N.C. WILD to help improve students' performance. Because the activities and support materials are interesting, locally oriented and hands-on, students are enjoying learning. N.C. WILD is helping to create a win-win situation for education.

"N.C. WILD is finally a workshop that is 100 percent applicable to the classroom," says Joani Hughes from Jefferson Elementary School in Forsyth County. "It's designed to be geared toward a student's perspective with clear directions, simple supplies and materials that stimulate interest and learning. When this workshop was over, I was amazed by all that I had learned. I was confident that I could transfer it to my class."

Teachers at all levels are benefiting from N.C. WILD. College students majoring in education are using the program to prepare lessons and create activities for their student teaching experiences. The use of N.C. WILD can provide a fresh new outlook to the classroom. Lori Gilbert, an education major at Western Carolina University, writes: "After N.C. WILD training, I realized that this program encourages children to learn through their own discoveries and to have some control over their own learning." N.C. WILD provides the solid educational supplement that these potential teachers seek.

Zora Weisbecker has taught many of these novice teachers. "It's my goal at N.C. WILD workshops to excite all of these potential teachers about using wildlife and environmental education as tools for teaching their subjects," she says. "I wish these workshops had been available when I taught high school biology 15 years ago, because I would have been prepared to teach in more exciting ways."

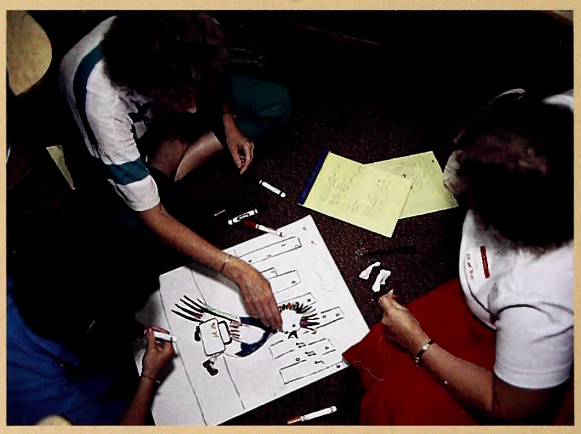
N.C. WILD training is one of the required workshops for environmental education certification provided through the N.C. Office of Environmental Education. In addition, participation in a 10-hour workshop provides each educator with one continuing education unit (CEU) of credit, which helps to meet requirements necessary to maintain a North Carolina teaching certificate.

Across the state, new and veteran teachers are looking for new teaching tools to reach today's youth and to accomplish the objectives of the state's ABCs Plan. For all of them, N.C. WILD can create an explosion of new knowledge, enjoyment, hands-on learning and innovative teaching. Many effective teachers have found that N.C. WILD is helping them make a positive difference in their indoor and outdoor classrooms. ⊠

"I Don't Teach Without It"

"Over the past two years, I have served as a visiting professor at St. Andrews Presbyterian College, teaching a science methods class for education majors. In setting up the course syllabus, consideration was given to what I wanted the students to be able to do upon completion of the course. In the best interests of the students whose lives these future teachers would touch, I knew I wanted them to teach science using an active learning approach where the teacher becomes the facilitator of the learning process. I also knew that Project WILD activities and the N.C. WILD program would enhance this approach. For their midterm exam, instead of the usual 'cram for the exam' strategy, I chose to offer 10 hours of Project WILD training through the N.C. WILD program. I knew that, with training and resources in hand, these future teachers would be equipped for exciting adventures in science. (Needless to say, my preservice teachers were very appreciative of a professor who believed in alternative assessment.) This concept has been so popular that the St. Andrews Sandhills Campus Program in Elementary Education in Southern Pines has followed suit, offering Project WILD training to its students as well."

—Beth Ammons is a teacher, administrator and college educator.



***During this** N.C. WILD workshop, teachers create imaginative birds in the activity called "Adaptation Artistry." Techniques like these help convey concepts like animal adaptation while reinforcing art and science objectives in the classroom.*

"At UNC-G we involve our education majors in preservice training based on a professional development schools model. This means our students have extensive school involvement for two years. Our elementary education majors join a theme-based cohort team of about 25 preservice students, one college faculty member and one doctoral student to work at two to three Guilford County schools over a two-year period of time. While the themes vary from math to technology to human development to literacy, all students have exposure to Project WILD activities through a required science methods course.

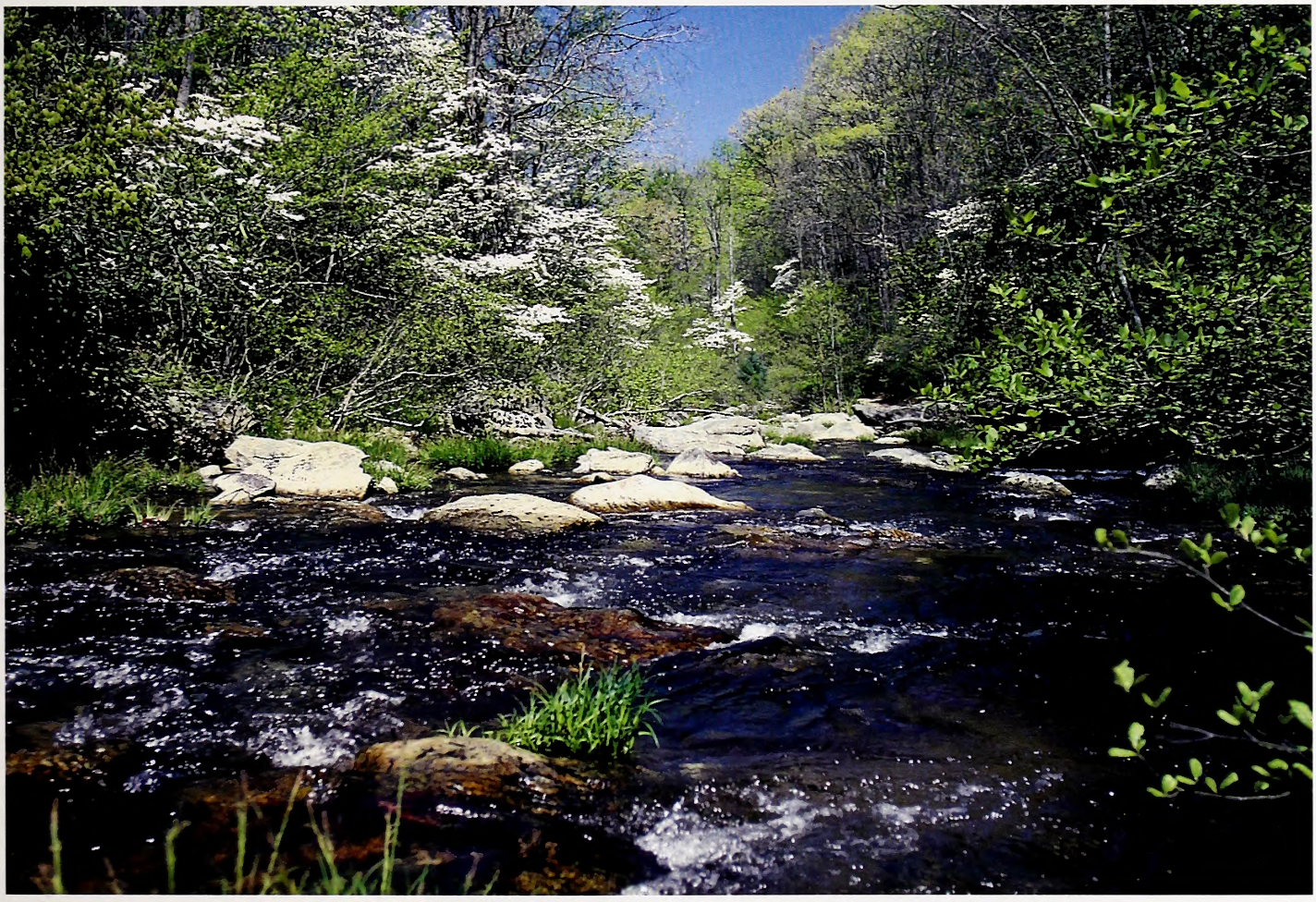
"For the past four years, I have directed a team of elementary education majors on an environmental education team. My teams have had both Project WILD and Aquatic WILD training. My students use the N.C. WILD training and materials in their preservice teaching training. In spring 1997, students renovated nature trails, and they used N.C. WILD to devise activities for using the trails.

"N.C. WILD training creates an interest among faculty and preservice students that promotes participation in other environmental education programs and activities, such as the N.C. State Parks Environmental Education Learning Experiences (EELEs) and mini-internship experiences at local centers like the Greensboro Natural Science Center. In fact, a former student, Joy Goodman, won Student Teacher of the Year, sponsored by the North Carolina Science Teachers Association (NCSTA). I was very impressed with her use of Aquatic WILD activities in her fifth-grade classroom as she prepared her students for a weeklong coastal experience."

—Katherine Matthews is a university educator at UNC-Greensboro.

For more information about this program, contact N.C. WILD, Division of Conservation Education, N.C. Wildlife Resources Commission, 512 North Salisbury St., Raleigh, N.C. 27604-1188, (919) 733-7123.

Treasures in Trust



Henry Fork, *South Mountains State Park*

In its 10-year history, the North Carolina Natural Heritage Trust has provided more than $27 million to save thousands of acres of the state's most significant natural and historical places for future generations. Here's what the program has done so far to protect some of North Carolina's priceless treasures.

written by Gina Rutherford
photographed by Ken Taylor

Treasures in Trust

Strip malls, subdivisions and their human inhabitants have become an all-too-common sight these days as North Carolina transforms from a rural to a suburban state. For many, this is a boom time for North Carolina. But prosperity has its price.

In this frenzy of development, many of the Tar Heel State's most prized wild and historic places are now threatened by earth-movers and bulldozers. Undeveloped land, it seems, is just too prized to leave alone. Thankfully, an innovative program established 10 years ago harnesses part of our suburban prosperity to save some of the state's most significant wild places for everyone to enjoy. It all starts with the sale of personalized license plates and property deed stamps.

The year 1997 marks the 10th anniversary of the creation of the North Carolina Natural Heritage Trust as a source of funding to help state agencies inventory and acquire land with outstanding natural and cultural values. Since it began, the trust has provided money to help purchase more than 43,000 acres of land across the state containing a variety of significant ecological and historical features. Each project adds valuable recreational, educational and cultural resources to our state's parks, forests, historic sites, game lands and nature preserves. The Natural Heritage Trust is accomplishing its mission to enhance our quality of life through the preservation and conservation of North Carolina's exceptional natural resources.

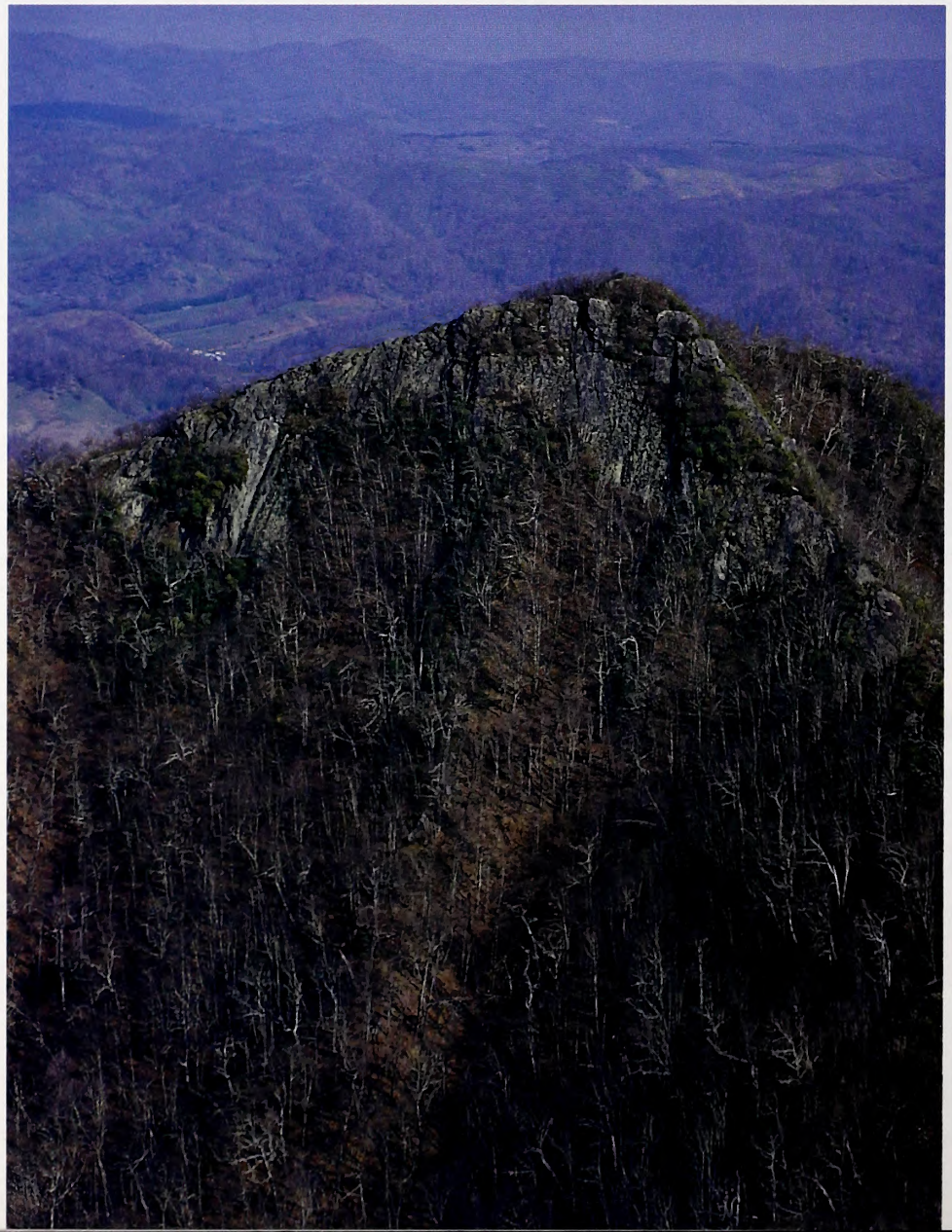
In 1987, state senators Lura Tally and Marc Basnight, with support from the North Carolina chapters of both the Sierra Club and The Nature Conservancy, the Friends of State Parks, and the N.C. Wildlife Federation, sponsored a bill to establish the Natural Heritage Trust. After receiving $275,000 from the General Assembly to start the program, the trust acquired a continuing source of funding in 1989 when a part of the receipts from the sale of personalized license plates was designated as income to the Natural Heritage Trust. Recognizing that development causes an increase in the value of property, the General Assembly in 1991 increased the state's $1 deed stamp tax to $2 and set aside 15 percent of the state's share of this additional money as income for the Natural Heritage Trust. The legislature again showed its support for the Natural Heritage Trust in 1995 by increasing the trust's share of the deed stamp tax to 25 percent.

With North Carolina's booming growth, trust funds have also increased. Last year, the Natural Heritage Trust took in more than $6 million. So far, the program has awarded more than $27 million in grants to various state agencies to save 36 wild and historic places in 29 counties across the state. Chances are you have visited several of the natural areas purchased through the program (see Land Acquisition list). And the number will continue to grow.

Grant applications from agencies within the Department of Environment, Health and Natural Resources; the Department of Agriculture; the Department of Cultural Resources; and the N.C. Wildlife Resources Commission are received by the Board of Trustees on a semiannual basis and are evaluated for their contribution to the state's plan for outdoor recreation, parks, natural areas development and wildlife management. The trustees consider the historical and cultural value of the projects, the significance of the ecological communities and any rare species that may be present. With the varied features of the three regions of North Carolina—the Mountains, the Piedmont and the Coastal Plain—the Natural Heritage Trust has never suffered from a lack of qualified projects.

A request in 1992 from the Division of Parks and Recreation for funds to acquire the Morganton watershed for inclusion in

Since its inception, *the Natural Heritage Trust has helped protect Three Top Mountain in Ashe County and other unspoiled mountain lands from development. As a Wildlife Commission game land, Three Top's caves, waterfalls and rock outcrops will continue to provide a diverse habitat for rare plants and animals like the endangered peregrine falcon (right).*

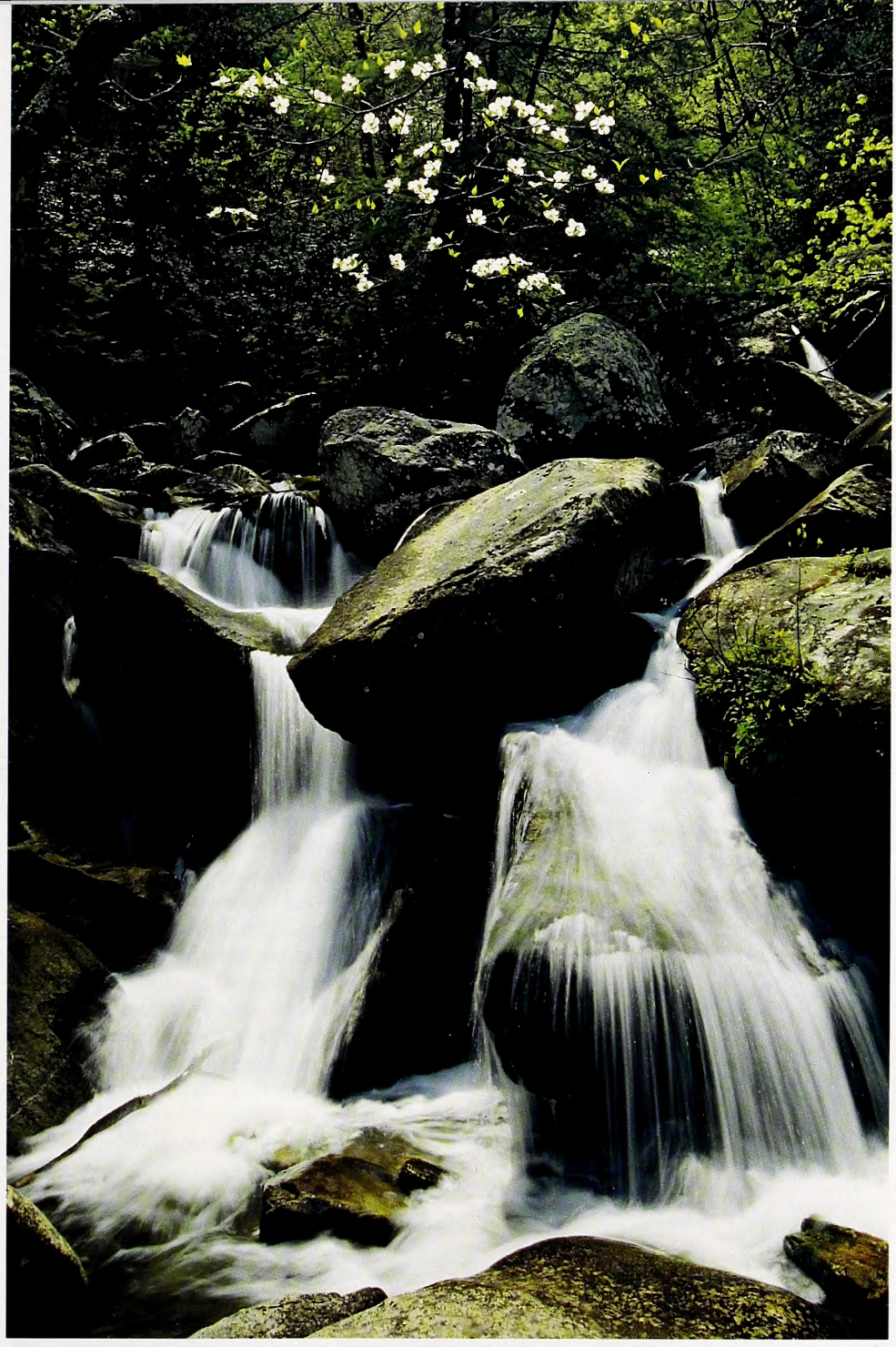


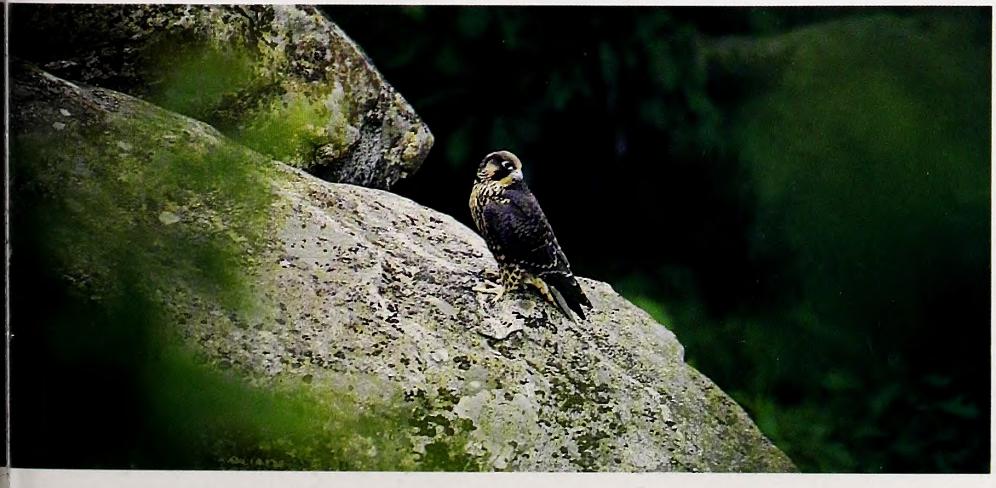
South Mountains State Park easily met the standards to qualify for a Natural Heritage Trust grant. The South Mountains are rugged and steep, with high forested ridges, riverside cliffs, deep laurel coves and low marshes. The ecological communities of this area are unique to the mountains. Though the South Mountains are inhospitable to humans, they support ideal habitat for numerous rare plant species, wide-ranging mammals and forest-interior animals. The area is rich with mountain laurel, tulip poplars, ancient hemlocks, beeches, chestnut oaks—and copperheads. More than 100 species of rare plants, including the small whorled pogonia, have been identified in the South Mountains.

Jacob Fork and Henry Fork, which drain the watershed, have been classified as Outstanding Resource Waters in recognition of not only the overall quality of the water but also the excellent habitat that they provide for a number of aquatic plants and animals. Brown and rainbow trout, smallmouth bass, rock bass and redbreast sunfish are abundant in these streams. Jacob Fork and Henry Fork offer valuable recreational opportunities for sportfishing and canoeing.

The watershed lands were purchased by Morganton in the 1920s to serve as the city's municipal watershed and have been closed to public access for more than 70 years. Adjacent areas also remained relatively undeveloped and inaccessible until the 1930s, when the Civilian Conservation Corps (CCC) established a camp in the South Mountains near the watershed. The CCC cleared debris from the streambeds, constructed a fire tower and a roadway, and opened this area to the public. Although the area remained fairly undisturbed, the establishment of South Mountains State Park in 1974 guaranteed that at least a third of the South Mountains would be protected. The purchase of the 2,025-acre Morganton watershed will extend the range of protection and provide a variety of recreational opportunities to the public.

The Natural Heritage Trust was also

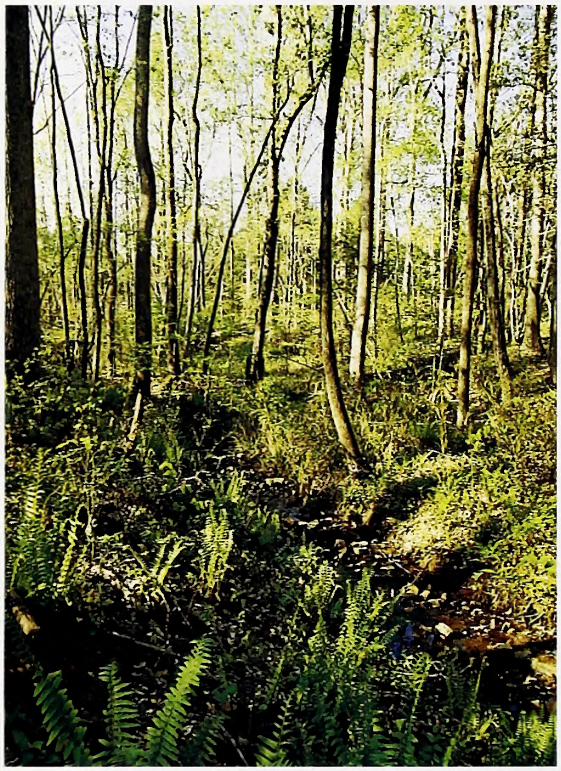




***Jacob Fork in** South Mountains State Park is just one of the many aquatic treasures protected by the Natural Heritage Trust. The pristine stream provides excellent habitat for wild mountain trout, smallmouth bass, rock bass and redbreast sunfish.*

Treasures in Trust

In the Piedmont, *the Natural Heritage Trust has helped preserve natural and historic places despite intense development pressure. Both Clemmons Educational State Forest (below) in Johnston County and Leigh Farm Park (bottom left) in Durham County have been saved for future generations.*



instrumental in protecting another valuable mountain resource. Three Top Mountain was slated for development as a ski resort, with nearby areas to be subdivided for residential and vacation homes. The failure by the developers to complete this plan created an opportunity to obtain the area for public ownership and to preserve a nationally significant site in Ashe County.

Three Top Mountain's varied elevations, caves, waterfalls and rock outcrops provide a diverse habitat for a number of rare plants found in few other parts of North Carolina. Spreading avens, mountain bluet and Heller's blazing star are just a few of the rare plants that occur here. There is also evidence that Three Top Mountain provides nesting habitat for the federally endangered peregrine falcon. Several animals of special concern, including the eastern small-footed bat, the northern long-eared bat, New England cottontails and Coopers hawks, make this area their home, along with deer, wild turkeys, squirrels and grouse.

The Wildlife Resources Commission quickly recognized the value of conserving the natural resources of Three Top Mountain. The location of Three Top's black bear population between other populations to the southwest and north of the mountain makes this area critical to the continuing existence of bears in western North Carolina. By funding this project, the Natural Heritage Trust achieves its objective of conserving a native natural community for the beneficial use and enjoyment of the public.

And the purchase of the land for the establishment of Three Top Mountain Game Land meets the Wildlife Resources Commission's objective of enhancing quality wildlife habitat and providing opportunities for public fishing and hunting. "The Natural Heritage Trust has been one of the greatest things that has ever happened for the conservation community in North Carolina," said Hal Atkinson, chief of the Wildlife Commission's Wildlife Management division. "It has protected valuable plant and wildlife habitats and ensured traditional outdoor activities like hiking, fishing and hunting in many areas."

In the Piedmont, the Natural Heritage Trust has funded many projects, including the purchase of land for Clemmons Educational State Forest in Johnston County. Surrounded by residential development, the forest remains a protected educational resource, providing a hands-on learning experience in forest ecology for schoolchildren and educators.

Once frustrated by the lack of funding to buy land in the area, forest supervisor Mike Huffman watched valuable acreage lost to development and valuable habitat lost for fox squirrels, wild turkeys and other wildlife. On the south side of the forest, housing was developed with little or no buffer to the forest. In many cases, sediment and riprap have permanently altered Strickland Creek, which weaves its way through the forest.

Natural Heritage Trust grants have helped to relieve Huffman's frustrations. "Funding from the Natural Heritage Trust has been a real godsend to Clemmons Educational State Forest," Mike said. "Without this source of funding, there would be very little opportunity to enlarge our forest."

Moody Clemmons, Clemmons Educational State Forest's first supervisor, began working with the forest in the 1930s when the CCC established the area as a seed nursery. As responsibility for the forest passed from the CCC to the U.S. Forest Service and then to the N.C. Division of Forest Resources, Moody Clemmons' affiliation changed, too. After his retirement, Clemmons made his own adjacent forested properties—land that had remained intact since the 1930s—available for sale to the state. A Natural Heritage Trust grant helped buy the land. The addition of this property provides a buffer between encroaching development and valuable forested land for the education of another of North Carolina's valuable resources—its children.

Another important Piedmont resource lies at the junction of Interstate 40 and N.C. 54 in southwest Durham County. Leigh Farm Park, located along New Hope Creek, serves two important functions: it preserves the cultural heritage of a middle-class, pre-Civil War farm and acts as the southern anchor for a plan to protect the creek from further development.

The 1835 farmhouse, built by Robert Stanford Leigh, still exists on the property,

Surrounded by subdivisions, *Clemmons Educational State Forest provides a haven for wildlife like this cricket frog and a hands-on learning resource for school children. Public ownership ensures the perpetuation of the forest and other wild places.*

along with many of the original outbuildings, including a carriage house, corncrib, smokehouse, well house and dairy. This portion of Leigh Farm is now listed on the National Register of Historic Places. A wealth of historic artifacts has been maintained by the Leigh family descendants. The collection includes furniture, farm implements and family manuscripts. Among the manuscripts is an essay written in 1893 by Ida Leigh, Robert Stanford's granddaughter, about her grandmother's garden at Leigh Farm. This essay provides an interesting account of a 19th-century garden.

The closeness of Leigh Farm to publicly owned lands at Jordan Lake makes it an important link in the New Hope Corridor Open Space Plan. The plan, adopted by Durham and Orange counties and the cities of Durham and Chapel Hill, attempts to conserve and protect the watershed from extensive development. The wooded floodplain not only provides winter habitat for wood ducks but also offers year-round homes to otters and minks and a variety of forest-interior birds, including Kentucky warblers, Acadian flycatchers, red-shouldered hawks and Louisiana water thrushes. The development of trails from Leigh Farm to Duke Forest and the Eno River, as called for in the open space plan, will provide excellent opportunities for wildlife viewing.

Support for preserving Leigh Farm began as early as 1982, and in 1991 a committee was formed to discuss options to protect this historical resource and cornerstone for the open space plan. With no zoning or regulatory controls to ensure protection, acquisition became the only available tool. Using funds from a variety of sources, the Historic Preservation Foundation of North Carolina acquired the Leigh Farm property, then sought a way to place the property in public ownership.

The Department of Cultural Resources (DCR) played a critical role in fulfilling this goal. With Natural Heritage Trust funds, DCR bought the main tract at Leigh Farm, as well as surrounding land. The purchase of Leigh Farm Park fulfills the Natural Heritage Trust's goal by ensuring the preservation of a cultural site with outstanding historical significance and the conservation of land that contains a significant wildlife and watershed corridor.

The Natural Heritage Trust has also played a key role in obtaining land for Lumber River State Park on the Coastal Plain. The unique ecological and historical values of the Lumber River provide ideal opportunities for the public to experience a blackwater river system. The quiet, slow-moving water flows from the Moore County Sandhills through Robeson and Columbus counties into South Carolina, through relatively undisturbed pine sand ridges, bottomland forests and cypress-gum swamps.

In 1978, the value of the Lumber River was recognized when it was designated as North Carolina's first recreational water trail. Since then, it has been designated as a National and State Canoe Trail and a State Natural and Scenic River and has been proposed as a National Scenic River.

Pottery, tools, arrowheads and other artifacts attest to the use of the river by Native

Where Does the Money Come From?

Since its inception 10 years ago, the N.C. Natural Heritage Trust has helped state agencies purchase more than 43,000 acres of naturally and culturally significant lands for public use. Besides protecting wild and historic places, trust funds have been used to inventory dozens of natural areas and communities across the state. Most of the money to pay for these projects comes from the sales of personalized license plates and property deed stamps.

For every personalized license plate sold in North Carolina, $10 goes to the Natural Heritage Trust. Property sales also boost funds, with 25 cents of every $2 deed stamp going directly to the trust. That adds up to a tidy sum when you consider that in 1996 alone the trust received $1.8 million for personalized plates and $3.9 million for property transfer stamps. Add in another $350,000 of interest earned on unused trust funds, and the Natural Heritage Trust took in $6.1 million last year. Not bad for a few license tags and deed stamps.

Treasures in Trust

Americans. During the late 18th and 19th centuries, the Lumber River provided an important transportation route for timber and naval stores. Evidence of a rail line, dock pilings and a canal can still be seen in the Net Hole area of the river, north of the U.S. 74 bridge near Boardman.

This river provides excellent habitat for numerous reptiles, amphibians and mammals, with sightings of alligators and black bears reported from time to time. Birds of prey such as hawks and owls are common. Water birds, including herons, egrets and kingfishers, are abundant. Deer, opossums, beavers, muskrats and raccoons share the river corridor with several rare plant species, including woody goldenrod and Carolina bogmint.

The Natural Heritage Trust's involvement in the purchase of land for Lumber River State Park has preserved an outstanding example of an ecological community with national significance. The scenic and archaeological significance of this beautiful river has been saved for the beneficial use and enjoyment of the public.

The Natural Heritage Trust has also been instrumental in the Division of Coastal Management's (DCM) efforts to preserve the maritime forest at Kitty Hawk Woods. Without Natural Heritage Trust funds, DCM would not be eligible for matching grants from the U.S. Fish and Wildlife Service—funds that are critical to the agency's ability to obtain property for the protection of coastal resources.

Acquisition remains the best available protection tool, not only for this rare natural community but for the dynamic barrier island as well. Maritime forests represent the most stable part of the island and play an integral part in preventing island overwash and flood-tide formation. Maritime forests absorb the wind and water energy from hurricanes, tropical storms and northeasters. Continued reduction of the remaining maritime forest will increase the vulnerability of the barrier island and its dynamic ecosystem to storms and weaken its ability to protect nearby mainland areas.

A walk through Kitty Hawk Woods reveals the role that it has played in protecting the island. Gnarled live oaks attest to the effects of salt spray on the exposed branches. Relict dunes are now stabilized with loblolly pines, laurel oaks, wax myrtle, yaupon and smilax. Swales filled with rainwater create freshwater ponds and provide homes for a variety of aquatic species, including salamanders, frogs, fish and water snakes. In addition to providing habitat for migratory neotropical birds and waterfowl, the protection of Kitty Hawk Woods ensures the survival of aquatic species in the marshes on the sound side of the island and protects the important wildlife corridor and the sound itself.

Once the purchase is completed, the Kitty Hawk Woods Coastal Reserve will provide the public with access to an outstanding example of a globally rare, natural coastal community. The opportunities to manage this area for recreational and educational uses abound.

Located on the Albemarle Sound and Bull Bay, Bull Neck Swamp comprises approximately 5,400 acres of both wetland and upland habitats. The acquisition of the swamp by the Department of Agriculture for the College of Forestry at N.C. State University protects approximately 7 miles of shoreline on Albemarle Sound. This stretch of shoreline is one of the few areas along the sound that has not succumbed to development. The swamp provides an important stepping-stone to three National Wildlife Refuges: Roanoke River to the west,

***The Natural Heritage Trust** has played a key role in obtaining significant coastal lands including those at Jockey's Ridge State Park on the Outer Banks. The park contains the largest sand dune on the East Coast.*

N.C. DEPARTMENT OF PARKS AND RECREATION

MELISSA McGAW

***Trust funds have** ensured homes for river otters as well as provided numerous recreational opportunities on the Lumber River (below) and other eastern North Carolina rivers and wetlands.*

Natural Heritage Trust Land Acquisition Awards (1987-1996)

Ashe County
- New River State Park
- Three Top Mountain Game Land

Brunswick County
- Bald Head Island Coastal Reserve

Burke County
- South Mountains State Park

Carteret County
- North Carolina Maritime Museum

Caswell County
- Caswell Game Land

Columbus County
- Friar Swamp

Cumberland County
- Bushy Lake State Natural Area

Currituck County
- North River Game Land

Dare County
- Buxton Woods Coastal Reserve
- Jockey's Ridge State Park
- Kitty Hawk Woods Coastal Reserve
- Run Hill State Natural Area

Durham County
- Historic Leigh Farm Park

Forsyth County
- Historic Bethabara Park

Gaston County
- Crowders Mountain State Park

Harnett County
- Raven Rock State Park

Henderson County
- Bat Fork and Ochlawaha Bogs Restoration Sites

Johnston County
- Bentonville Battleground State Historic Site
- Clemmons Educational State Forest

Martin County
- Roanoke River Wetlands Game Land

Moore County
- Weymouth Woods State Natural Area

New Hanover County
- Masonboro Island Coastal Reserve

Orange County
- Eno River State Park
- Occoneechee Mountain State Natural Area

Pender County
- Northeast Cape Fear Wetlands

Polk County
- Green River Game Land

Robeson County
- Lumber River State Park

Stokes County
- Hanging Rock State Park
- Moores Springs 4-H Youth Camp

Transylvania County
- DuPont State Forest

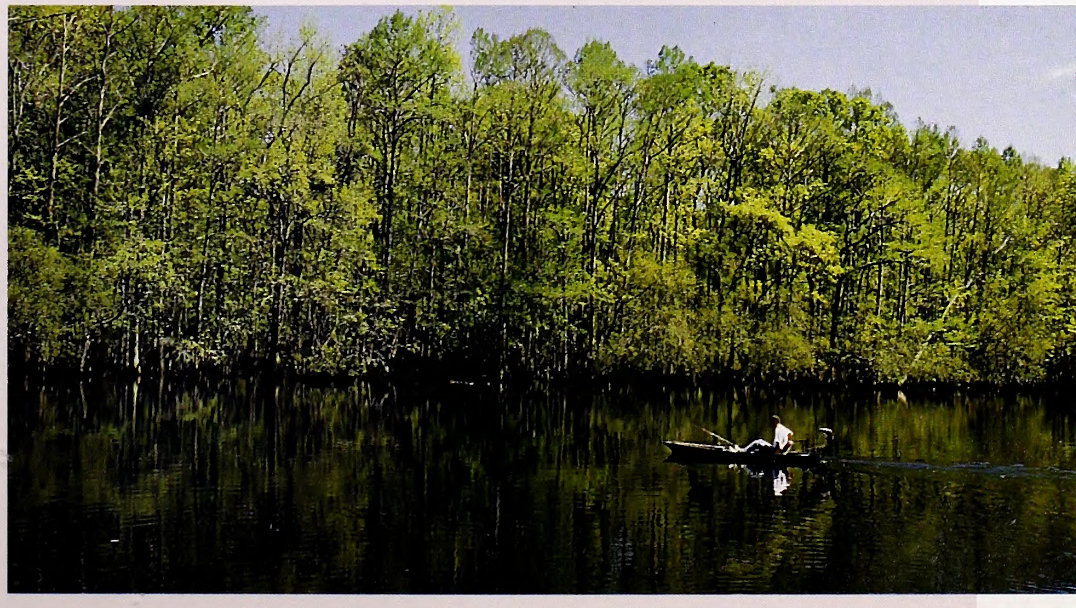
Tyrrell County
- Walter B. Jones 4-H Environmental Education Center

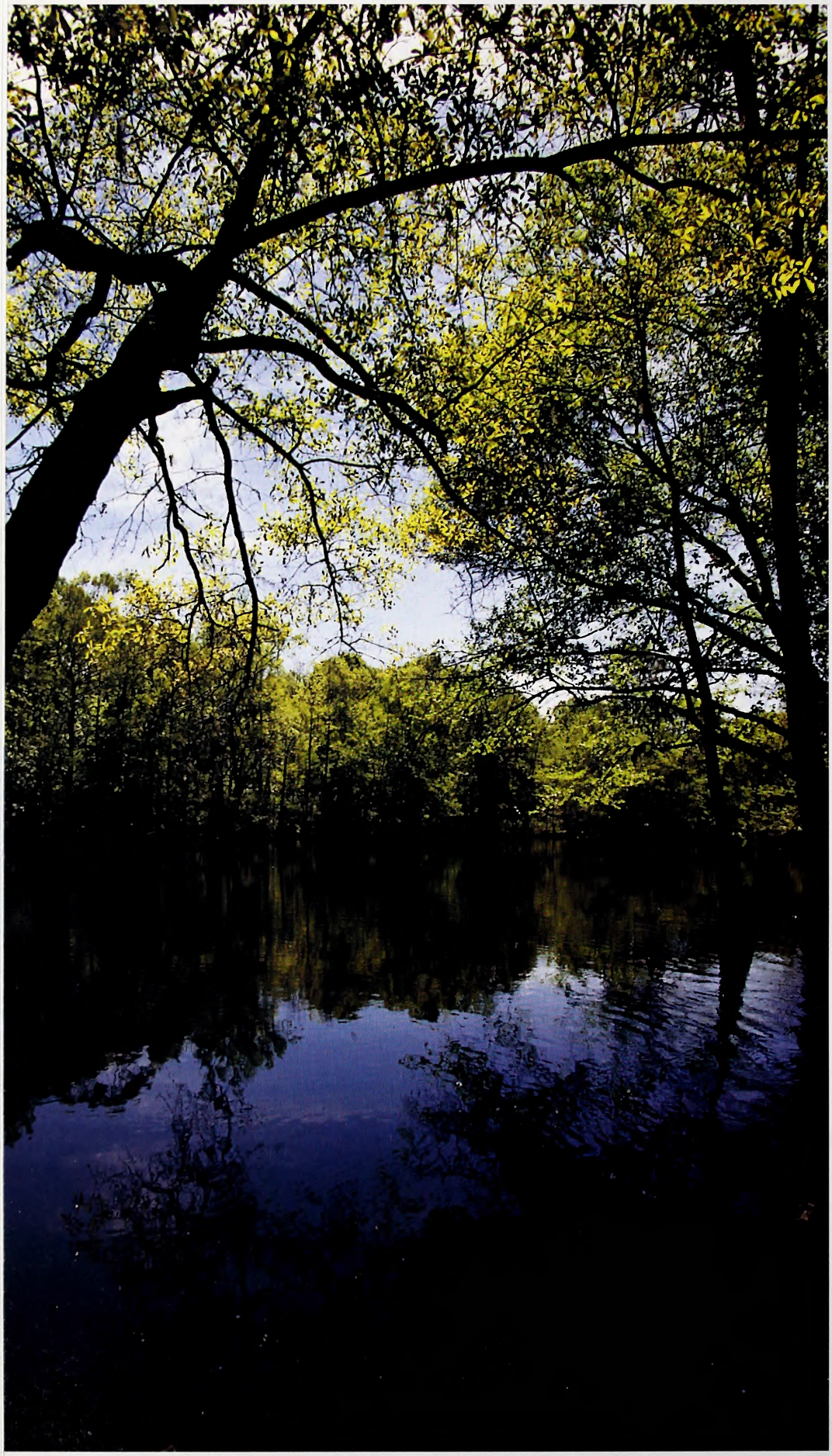
Wake County
- William B. Umstead State Park

Washington County
- Bull Neck Swamp

Wilkes County
- Stone Mountain State Park

Yadkin County
- Donnaha Historic Native American Site





***By working closely** with local conservation groups and various state agencies, the Natural Heritage Trust has helped preserve thousands of acres of wild and historic places like Lumber River State Park for the benefit and enjoyment of the people of North Carolina and their children.*

Pocosin Lake to the south and Alligator River to the east. Black bears, as well as small mammals, birds and reptiles, benefit from this extensive area of protected habitat.

Bull Neck Swamp also boasts healthy stands of Atlantic white cedar, a species that has been extensively logged throughout its range. The Bull Neck Swamp population offers opportunities for research into the ecology and silviculture of this species and could contribute to the restoration of the Atlantic white cedar forests in other areas. The swamp also presents a tremendous potential for researchers to study the relationship between terrestrial habitats and estuaries.

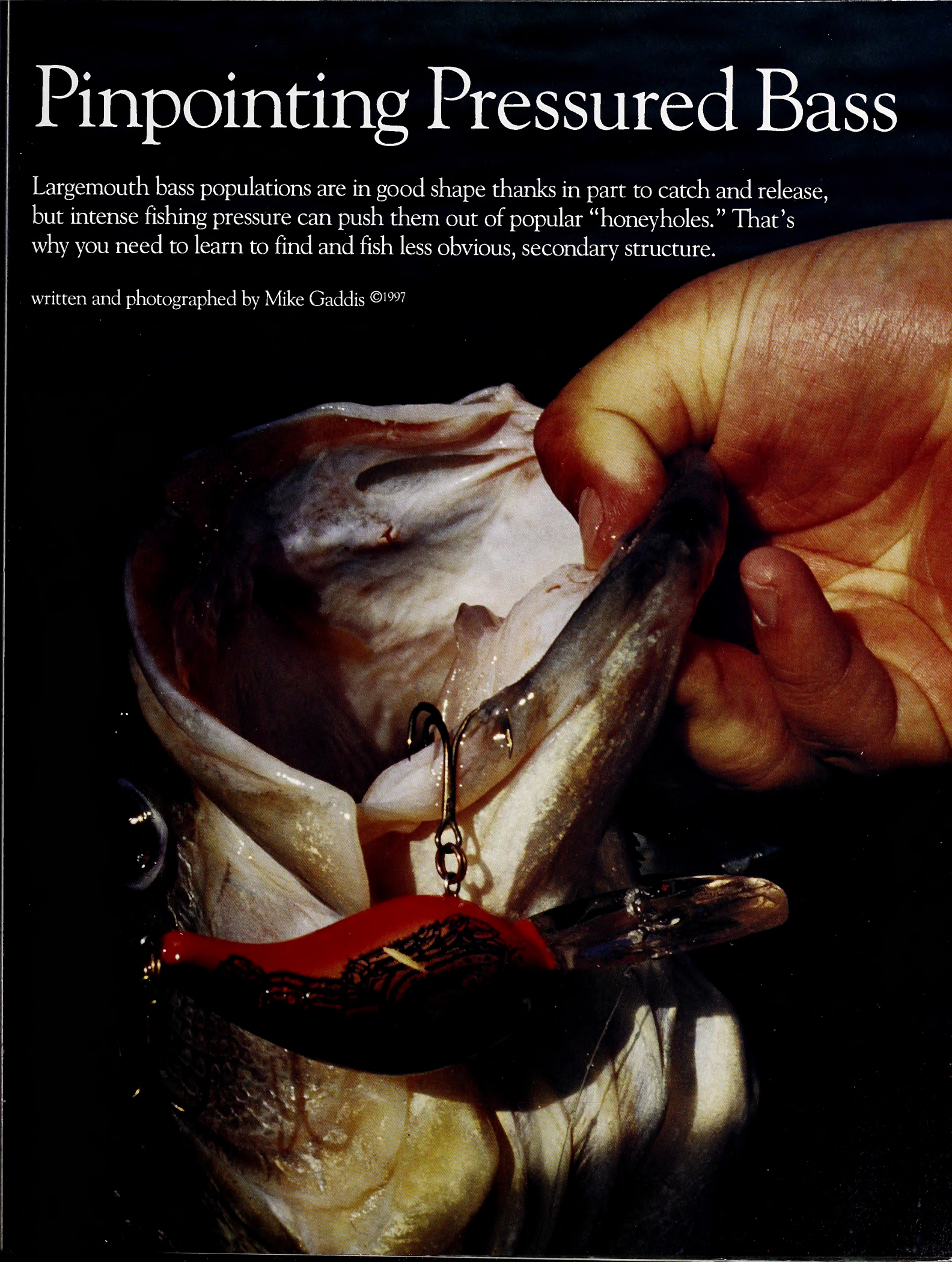
"The tidal freshwater marsh along Deep Creek at Bull Neck Swamp has a high diversity of plant species," said Richard LeBlond of the Division of Parks and Recreation's Natural Heritage Program. "It is one of the most beautiful examples of this marsh community in North Carolina." With the help of the Natural Heritage Trust, the aesthetic qualities of this resource have been preserved.

There is a strong commitment on the part of the Natural Heritage Trust Board of Trustees to fulfill the responsibility that the people of North Carolina have entrusted to them. Each of the projects presented to the Natural Heritage Trust represents a unified effort by concerned citizens and local conservation groups, such as the South Mountains Coalition, the Lumber River Conservancy, the Triangle Land Conservancy and the Friends of State Parks, to assist state agencies in the identification of North Carolina's most significant natural areas and habitat for rare and endangered species. Trust funds have placed scenic waters, mountain habitats, valuable educational resources, historical and cultural sites, and recreational opportunities in public ownership for the benefit of the people of North Carolina and their future generations. ⊠

Pinpointing Pressured Bass

Largemouth bass populations are in good shape thanks in part to catch and release, but intense fishing pressure can push them out of popular "honeyholes." That's why you need to learn to find and fish less obvious, secondary structure.

written and photographed by Mike Gaddis ©1997



The calendar had tripped into July, 24 hours shy of Freedom Day, and there was ample evidence of that holiday on the water. Rapidly advancing upon us in staggered legions of rooster tails was a seemingly impenetrable wall of recreational boaters.

The bow of my Ranger sliced an incoming swell, catapulted airborne on its lift, then fell into the trough with a gut-jolting pound, sending cascades of spray starboard and port. I whipped my sunglasses off so I could see again, throttling back for the umpteenth time, and we continued to thread our way toward a fishing destination. Teddy Roberts, alongside, was drenched and spewing.

"You still bent on this?" he sputtered. I looked at him wall-eyed.

There was a bass boat on every point, another over every subsurface structure, and scores more hovering on standby like aircraft at JFK awaiting a landing clearance. We literally ran headwaters to dam without a single open berth at any of our favorite stop-offs.

I pulled up in desperation to plot strategy. The boat dropped off its plane about as forlornly as our hopes and glided to an indecisive halt. I knew where I wanted to fish: an underwater bar a few miles back. History said time was right. But the three boats there had staked a deed and no doubt beat it to death to boot. Still...

"Hang on," I told Teddy. The boat bounded out of the hole and leveled northbound, backtracking, straight into the maw of a black cloud that had stolen silently above the horizon like a tower of billowing smoke. "Aaugh-oh," Teddy winced. Halfway back and far from the ramp, lightning walked, thunder crashed, the wind turned the leaves inside out, and we ran headlong into stinging sheets of rain. We limped into a cove to ride it out.

Forty-five minutes later the sun was breaking through in sweet, limpid rays, and the lake was clear of other boats.

The storm was only a drumroll into the drama that followed. There was a single, prominent stump 40 yards north and 20 feet east of the tip of the bar, hard by the lee of the river channel. Fifteen feet of water covered it, and you could run a depth finder anemic trying to find it unless you were very, very careful. It was not a part of the main structure of the bar, but an integral and crucial part of the bar "system," as regards its holding attraction for bass. I had located it two summers before and had caught several good fish there since. I was banking that, although the main structure had been raked, the wayside stump had not.

My fish bored deep and away into the river before I could gain the edge and roll her over. Immediately flanking her forward drive, she strove for slack and drove for the top. I wildly fumbled the reel handle as Teddy's fish blew skyward 5 feet off the gunnel, showering me with its departing wake.

Though I had it triangulated, 15 minutes of tedious searching lapsed before I could pinpoint ground zero and drop an inconspicuous black marker to keep us oriented. Backing to a comfortable distance, Teddy and I pumped simultaneous casts past the marker and over the channel, burning the crankbaits down to working depth. I could feel the plug subsoiling the bottom moments before it careened off the stump, and *whoomph*! There was an arresting collision, a spongy surge, and the reel locked down. Almost the same instant, I heard Teddy grunt like he'd been stomach-punched. I glanced quickly his way. His rod was arched to the water and the drag zipped. He was in blissful distress.

My fish bored deep and away into the river before I could gain the edge and roll her over. Immediately flanking her forward drive, she strove for slack and drove for the top. I wildly fumbled the reel handle as Teddy's fish blew skyward 5 feet off the gunnel, showering me with its departing wake. Breaking even just in time, I managed to pull my fish off balance after three heavy, surface-churning heaves of a tremendous head and turn her boatward. Teddy had his alongside again, but the lunker female was far from over and bulled under the boat, threatening the rod tip. Frantically maneuvering the fish around the stern, he plunged the rod to his elbows to clear the motor skeg.

In parenthetical iridescence, both fish blew the top again on opposite ends of the boat, and, after 60 seconds of forever, finally succumbed.

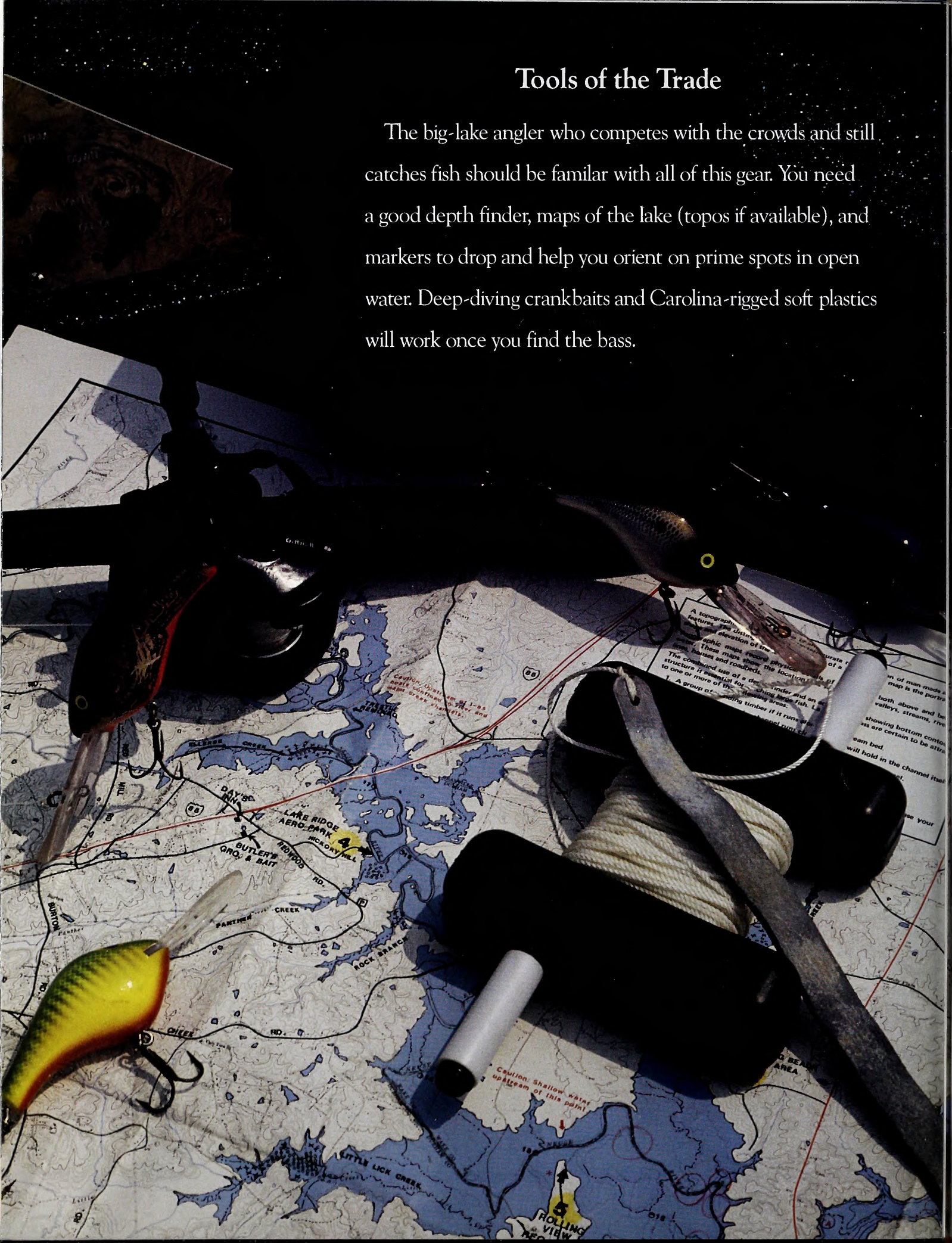
Cackling maniacally and trembling with exhilaration, we hoisted them to each other, 7-pound-plus twins. It was only the beginning. In the half-hour aftermath was a largemouth experience so phenomenal that both Teddy and I are reluctant to tell anyone about it. Because no matter how truthfully you render it, it still sounds fabricated. Moreover, two weeks later, fishing alone, I enjoyed a carbon-copy afternoon at the same place. Spectacular!

Days harboring that kind of bass mother lode on hard-fished lakes are admittedly rare but have happened more frequently since I discovered an intriguing phenomenon about "burned-out" structure, one that has salvaged many a summer day.

Not more than 10 to 15 years ago, productive concepts for fishing underwater "structure"—bars, humps, ledges, submerged timber, creek/river confluences—were an enigma to the majority of fishermen. Today, on every bass lake of even moderate renown, the primary subsurface structures are not only well known to the majority but are scoured by many fishermen on any summer weekend. So intensely are they scoured that many places which were once "super holes" have been fished into virtual sterility and now produce little more than frustration. Though it may seem to many that structures that have reached this stage are ready for burial in the angling boneyard, in fact they may still harbor amazing pockets of nice bass. The key for unlocking their dormant potential is a reorientation around remote features.

Ultrasmall caches of subordinate cover on the fringes of larger, submerged structure are often so subtle as to be overlooked and

***Teddy Roberts shows** off a trophy largemouth that hit a deep-diving crankbait on a heavily fished Piedmont lake. Teddy and the author have learned that bass this size aren't always found on the most obvious pieces of deep structure, but are often nearby on harder-to-find secondary structure.*



Tools of the Trade

The big-lake angler who competes with the crowds and still catches fish should be familar with all of this gear. You need a good depth finder, maps of the lake (topos if available), and markers to drop and help you orient on prime spots in open water. Deep-diving crankbaits and Carolina-rigged soft plastics will work once you find the bass.

can hold some tremendous bass—sometimes breathtaking numbers of large, school fish. Indeed, some of the very biggest bass hold at these places because of their superior correlation to deep water and channel patterns. Since I began concentrating on such cover as a fallback for overfished lakes, I am repeatedly amazed at just how little it takes, provided it is in the right place. By attentive and patient reconnaissance with the depth finder, I have discovered several such places near burned-out primary structures and have rejuvenated my chances for good bass, even when the lake is swarm-ing with fellow fishermen and pleasure boat traffic. Now, I consider "pinpoint cover" the deadliest secret in my bass fishing strongbox and have a repertoire of GPS fixes on every lake I frequent.

Not every primary structure will harbor pinpoint cover, but many of the best do. Finding these pinpoint hot spots, once you concentrate on it, is not as difficult as it may seem.

In the search, it is essential to think of an underwater structure as a "system," rather than just a prominent topographic peculiarity. It is the dramatic topographical character of good structure, usually in its relation to plunging slopes and deeper water, that sets up the broad parameters for attracting bass, but the correlation of its subordinate features determines its final productivity.

Along with dramatic contour, profitable structure will boast prodigious bottom cover and a shallow-to-deep depth range that attracts baitfish and maximally encourages bass to hold in ambush along its slope. More importantly, somewhere on or near the primary structure will be an abrupt and distinctive feature that has exceptional attraction for bass. This is the heart of the system. Examples are a sudden outcropping of rock that rises within 10 feet of the surface, or an isolated, dense cluster of vertical brush 15 feet down. It is often near the sharpest angle of the slope, and favorable to the predominant current flow. While some bass will always ripple along the more general contours of the structure, the most and the largest will hang near its heart. Most experienced bass fishermen are familiar with such places and focus their efforts there.

A crucial point from my own bassing experience of many years and that of other seasoned bass angling acquaintances is that, after the original heart of a piece of good structure has been hammered by fishing pressure for seasons on end, bass do not leave the structure entirely, as it often seems. Rather, they retreat to a more distal and very specific subordinate feature of the system, in effect translocating its heart.

By finding and pinpointing these locations, you can often enjoy fishing success that rivals that of earlier years, because these spots are rarely fished and not nearly so evident to other fishermen as the primary structure.

MELISSA McGAW

***Where fishing pressure** is intense, especially on big impoundments, the fisherman who consistently succeeds is the one who knows how to find cover that most fishermen overlook. This angler used a soft-plastic lure fished deep to bag this bass.*

As an average, on most bass superstructures the prominence peaks within 9 or 10 feet of the surface, and its slope falls precipitously through midrange water of 12 to 18 feet before tumbling into the extreme depths of a main channel. In summer, larger bass generally hold in the midrange sector. Therefore, you should look for pinpoint cover in 14 to 18 feet of water at the fringes of the primary structure on the same side as the *incoming* current flow. As an additional clue, be aware that pinpoint cover will usually have the same angle of orientation to current flow as the original heart of the structure.

Proceed slowly with both flasher and digital graph in operation. Stop and triple-check any prominent aberration in bottom character that rises at least 3 to 4 feet. If it appears likely, mark and fish it. I have located new holding locations in a structure system on an extended midrange depth contour 40 to 50 yards or more from the original heart. In all cases, there was a logical line of depth fall or scattered cover pattern from the primary structure, which convinced me I was still within the same system. A little patience will reap large and ongoing dividends. It is important in test-fishing pinpoint cover to fish it precisely. Close is not good enough. The newer, hand-held GPS instruments are a great boon to relocation once you have discovered a promising spot.

Once you have located it, fish pinpoint cover avidly during the same period the original structure was most productive. All good bass holes have a prime time.

My wife, Loretta, and I fished a structure on Buggs Island (Kerr) Lake in southern Virginia recently on a crowded day. I have fished it since the early '70s. It's classic, arising out of 50 feet of creek channel to within 9 feet of the surface, rich with brush and rock, and surrounded on all sides by deep water. Its uppermost surface area is littlemore than the size of a large picnic table. It was immensely productive for big fish in the 10 years after a friend and I found it, but it became progressively more familiar to anglers and has suffered unbelievable pressure in the last decade.

True to form, we worked ourselves blue in the face on the primary structure with crankbaits, Texas and Carolina rigs, Rat-L-Traps, and even jigged spoons and turned little more than a trio of small-timers. Enough was enough.

I hauled anchor, eased the boat 60 yards north and reoriented. There's a minute jag of rock 17 feet down that comes up out of nowhere along the long toe of the original hump, just by the brink of the channel. I had just boated a 6-pound largemouth on the end of my first cast and was rerigging when a Stratos and two Skeeters whined by, their occupants straining for a fix.

I admit it. There was a vicarious delight in knowing that from their perspective it could only appear that I had drifted off the main attraction. Actually, I was sitting on it. ⊠

Certify That Trophy Fish

Caught a really nice fish? Want some recognition for it? Now, thanks to the N.C. Angler Recognition Program (NCARP), you can apply for a certificate for those trophies that exceed certain minimum weights.

written by Keith Ashley

KEN TAYLOR

Have you ever caught a really nice, bragging-sized fish and wished you had received some form of recognition of your catch other than a few color pictures or an expensive mount of the fish itself? We're not talking about a record-breaking fish, but one big enough that your friends and neighbors would call it a "trophy" and pat you on the back. Now, at last, you can get that recognition—official recognition, at that. And you don't have to kill the fish—you can turn the fish loose immediately.

The North Carolina Wildlife Resources Commission's Division of Boating and Inland Fisheries has recently begun a program called the North Carolina Angler Recognition Program (NCARP). As of July 1, 1997, any angler who catches a fish that meets certain size criteria can apply to the division to have his or her catch recognized as a "trophy" fish, and receive a special certificate. This program, by the way, should not be confused with the division's State Record Fish Program, which certifies new state record fish (largest fish recorded caught for that species in the state). NCARP, on the other hand, will provide for the recognition of all anglers who catch sizeable fish, not just those that qualify as a state record.

NCARP will involve two levels of angler recognition. For anglers catching fish exceeding minimum trophy weight or length criteria (see table on opposite page), a "Trophy Fish" certificate will be awarded. The certificate will be printed on high-quality paper suitable for framing, and the species honored will be pictured on the certificate. For anglers catching six trophy fish of the same species or six different species of trophy fish, a "Master Angler" certificate and patch will be awarded.

Either length or weight can be used to

qualify a fish for a certificate—it's up to the angler to decide—and the angler can immediately release his trophy if he so desires, thereby giving himself and other anglers an opportunity to catch it again later. Thus, there's no need to find certified scales or go to a lot of trouble—simply measure the fish or weigh it on a reliable set of hand scales. This means, of course, that the application process will be conducted on the "honor system."

Application forms to certify a fish as a trophy will be available at bait and tackle shops, sporting goods stores, and other outdoor retailers. An application fee of $5 will be assessed to help cover costs associated with the new program and ensure that NCARP is self-funded. Additional information about this program can be obtained from the Division of Boating and Inland Fisheries, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188 or by calling (919) 733-3633.

Anglers are urged not to confuse NCARP, which certifies freshwater fish, with a similar program sponsored by the N.C. Division of Marine Fisheries for anglers who catch trophy saltwater fish. Application forms for this program—called the Saltwater Angler Awards Program—can be obtained from marinas, some charter boat captains, and bait and tackle shops located along the coast. For more information about the saltwater recognition program, contact Dale Ward of the N.C. Division of Marine Fisheries at 1-800-682-2632.

In addition to allowing greater involvement by the fishing public in the Wildlife Resources Commission's programs, it is anticipated that NCARP will provide valuable information regarding the quality of fishing in many of the Tar Heel State's ponds, lakes, streams and rivers. Awards program records will be stored on computer, and annual summaries will provide information on the number of trophy fish caught by location, species and water type. By monitoring the number of awards issued from specific bodies of water over periods of time, the commission's biologists can make note of changes in the size structure of trophy fish populations and identify trophy fish "hot spots."

The next time you catch a bragging-sized fish, fill out an application and have your fish certified as a trophy fish. Your big catch will be recognized on a statewide level, and you will be providing valuable information to the biologists who manage North Carolina's freshwater sport fisheries. Who knows, some day you might even be recognized as a Master Angler. ⊠

Minimum Trophy Fish Weight or Length Requirements

Catch	Minimum Total Weight	Minimum Total Length
Bass		
Bass, Bodie	8 pounds	24 inches
Bass, largemouth	8 pounds	24 inches
Bass, smallmouth	3 pounds	19 inches
Bass, spotted	2 pounds	15 inches
Bass, striped	10 pounds	27 inches
Bass, white	2 pounds	17 inches
Bowfin	10 pounds	22 inches
Carp	20 pounds	34 inches
Catfish		
Blue catfish	30 pounds	41 inches
Channel catfish	10 pounds	30 inches
Flathead catfish	30 pounds	41 inches
White catfish	4 pounds	21 inches
Crappie (black or white)	2 pounds	16 inches
Gar, longnose	10 pounds	48 inches
Muskellunge	20 pounds	41 inches
Perch, white	1 pound	12 inches
Perch, yellow	1 pound	14 inches
Pickerel, chain	4 pounds	26 inches
Shad, American	3 pounds	16 inches
Shad, hickory	2 pounds	13 inches
Sunfish		
Bluegill	1 pound	11 inches
Flier	0.4 pound	8 inches
Green sunfish	1 pound	9 inches
Redbreast (robin)	1 pound	11 inches
Redear (shellcracker)	1 pound	11 inches
Warmouth (goggle-eye)	1 pound	11 inches
Rock Bass	1 pound	11 inches
Roanoke Bass	1 pound	11 inches
Trout, mountain		
Hatchery Supported		
Brook trout (speckled)	2 pounds	16 inches
Brown trout	2.5 pounds	18 inches
Rainbow trout	2.5 pounds	18 inches
Wild Trout Waters		
Brook trout (speckled)	0.5 pound	10 inches
Brown trout	2 pounds	15 inches
Rainbow trout	0.75 pound	12 inches
Walleye	6 pounds	23 inches

***A trophy musky (left)** is just one of the 32 species that qualifies for the Wildlife Commission's new certificate program.*

New North Carolina Waterfowl Stamp, Print Now Available

*"**Wood Ducks** at Orton Plantation" by Wilhelm J. Goebel is the subject of this year's North Carolina waterfowl stamp and print. The painting is the second in the N.C. Wildlife Heritage series.*

Written and Edited by Rodney Foushee

The 15th edition of the North Carolina waterfowl stamp features a pair of wood ducks over the lower Cape Fear River with Orton Plantation in the background. Wilhelm J. Goebel of New Jersey painted the scene. Goebel's painting, "Wood Ducks at Orton Plantation," is the second in the North Carolina Wildlife Heritage series. The series of six stamps and prints will feature significant historical sites across the state that have played a role in the rich waterfowl traditions of North Carolina.

Since its origin in 1725, Orton Plantation has provided a haven for waterfowl visiting the southern Cape Fear River lowlands. The plantation house, enlarged and renovated several times over the years, was constructed to be the home of Roger Moore who came from South Carolina with his family and friends and settled along the Cape Fear River. These early settlers also founded the nearby town of Brunswick which soon became the seat of government for the area.

Moore and his fellow planters developed a thriving rice industry in this, the northern extreme of the Atlantic Coast's rice-growing region. Orton became the state's leading rice plantation, known for the superior quality of its grain.

Though the rice industry is long gone, the flooded fields and nearby woodlands and marshes still attract and provide sanctuary for waterfowl as well as plenty of other birds and wildlife species.

Goebel, a nationally known wildlife artist, is no stranger to success. In the past, he has designed fishing stamps for New Jersey, Delaware and Illinois, but his specialty is birds. In 1996, his work was chosen for the New Jersey, North Dakota and Alaska waterfowl stamps. He was also last year's federal duck stamp artist.

The N.C. Wildlife Resources Commission began its duck stamp and print program to raise funds for waterfowl conservation, including acquiring and improving habitat. Since 1988, North Carolina waterfowl hunters have been required to buy a state stamp in addition to the federal duck stamp.

Money from the sale of state stamps and prints goes into the Wildlife Commission's Waterfowl Fund, which has raised more than $3 million since it began. The fund has helped in the purchase and improvement of thousands of acres of wetlands, including Conine Island in Bertie County, Hunting Creek Swamp in Davie County and the White Oak Impoundment in Onslow County. The money is also used to help the state meet its financial obligations in implementing the North American Waterfowl Management Plan. In addition, funds have been used to support Canada goose research and to buy equipment used to manage wetlands.

State waterfowl stamps go on sale July 1 for $5 each. Prints may be purchased from independent art dealers at a retail price of $141.

The Wildlife Commission continues to solicit ideas from the public for sites they consider worthy of celebration through the N.C. Wildlife Heritage series of stamps and prints. Send suggestions to: Duck Stamp Ideas, Division of Conservation Education, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C., 27604-1188.

Yadkin County Teams Win Hunter Education Tournament

Two Yadkin County teams won championships in the North Carolina Wildlife Resources Commission's annual Hunter Education Tournament held recently at Millstone 4-H Camp near Ellerbe.

Forbush High School scored 2,965 points to take top place in the senior competition over 25 other North Carolina teams. John A. Holmes High of Edenton placed second with 2,951 points and West Davidson High took third with 2,944 points.

Fall Creek Elementary scored 2,639 points to win the junior division, which fielded 10 teams. Perquimans Middle School took second place with 2,609 points and Chowan Middle School placed third with 2,558 points.

Matthew Davis of Forbush was the top overall individual scorer with 755 points. Timmy Hedgepath of Gates County was second in the senior division and Josh Bower of West Davidson placed third. In the junior competition, Mark Lawson of Fall Creek captured the top individual honor with 700 points. Jeff James of Orange Junior High placed second while Josh Goodnight of West Rowan Middle took third.

Scores are based on rifle, shotgun and archery competition as well as hunter skills.

By winning, Forbush and Fall Creek earned the right to advance to the National Youth Hunter Education Challenge to be held in Raton, N.M., later this month.

Both teams are strong contenders for top honors. Forbush has already won three consecutive national titles while Fall Creek placed second in the national junior competition in 1994. Fall Creek has also taken the state junior title four of the past five years.

—Bodie McDowell

KEN TAYLOR

***Rifle marksmanship is one of** the areas of competition at the Wildlife Commission's annual Hunter Education Tournament held at Millstone 4-H Camp near Ellerbe.*

Trees for Wildlife

Volunteers from several conservation groups teamed up with the N.C. Wildlife Resources Commission to plant apple trees this spring on the Pisgah Game Land in northern Burke County.

More than 20 volunteers gave up a Saturday in March to help Commission employees from the Crossnore Wildlife Management Depot plant 86 apple trees at nine sites on the mountain game land. The young trees, which were protected with wire and plastic cones to prevent excessive damage from deer and other browsers, will provide a supplemental food source for wildlife in the future.

Participants included members of the High Country Sportsman's Coalition, the Foothills Chapter of the National Wild Turkey Federation and other local sportsmen. Ten inmates from the N.C. Division of Forest Resources' Young Offenders Forest Conservation Program also helped. These efforts should help enhance wildlife habitat in the area and improve hunting and wildlife viewing for future generations.

—Kip Hollifield

Cape Fear Garden Club Adopts Battery Island

The Cape Fear Garden Club has made history by becoming the first private group to adopt one of the National Audubon Society's coastal island sanctuaries in North Carolina.

The club's $1,000 donation will help pay a warden to take care of Battery Island and several other nearby coastal islands while colonial waterbirds are nesting there. The 100-acre island near the mouth of the Cape Fear River at Southport is a critical nesting area for several different types of waterbirds including herons, egrets and ibises. More than 90 percent of the state's white ibises nest on Battery Island with about 8,900 pairs counted there this spring.

"This really helps out," said Walker Golder, the Audubon Society's North Carolina sanctuary manager. "The club has just embraced the island and helped take some of the financial pressure off the program." In recent years, the Audubon Society has had difficulty raising the $5,000 needed to pay a warden to monitor Battery Island during the five-month nesting season, Golder said.

Besides helping pay for the warden, garden club members have helped remove trash and debris from the island. The adoption also helps raise awareness for conservation and monitoring of colonial nesting birds.

"Hopefully this is the beginning of a positive trend," Golder said. "We would love to see more groups adopt these islands."

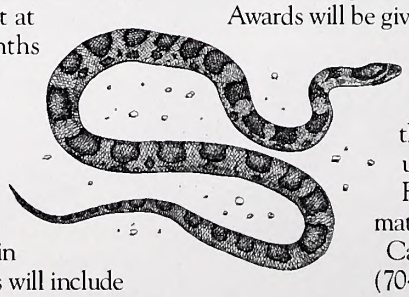
The Audubon Society manages 20 different coastal bird sanctuaries from Ocracoke to Southport, including five jointly with the N.C. Wildlife Resources Commission. To protect nesting birds from disturbance, access is prohibited from April 1 to Aug. 31 on Battery Island and other coastal islands and beaches posted by the Wildlife Commission as Colonial Waterbird Nesting areas.

KEN TAYLOR

***Battery Island near Southport** is a critical nesting area for several species of colonial waterbirds including the white ibis (above). More than 90 percent of North Carolina's white ibises nest on Battery Island.*

Outdoor Calendar of Events

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be sent at least four months in advance.



July 5

The 34th annual Coon Dog Day will be celebrated in Saluda. Events will include crafts, food and entertainment as well as a night hunt, dog show and a treeing contest sponsored by the Saluda Coon Hunters Association. For more information, call (704) 749-2581.

July 19

A snake beauty pageant will be held at the Western North Carolina Nature Center in Asheville. Participants are encouraged to bring in both native and exotic non-poisonous snakes. Awards will be given for various categories including the longest and the most unusual snake. For more information, call John Campbell at (704) 298-5600.

July 23

A red wolf howling safari will be held at the Alligator River National Wildlife Refuge in Dare County. After a brief informative meeting at the N.C. Aquarium on Roanoke Island, participants will caravan out to the refuge and try to entice captive and red wolves to howl. The free program starts at 7:30 p.m. at the aquarium and last several hours. For more information, call the refuge at (919) 473-1131.

Aug. 2

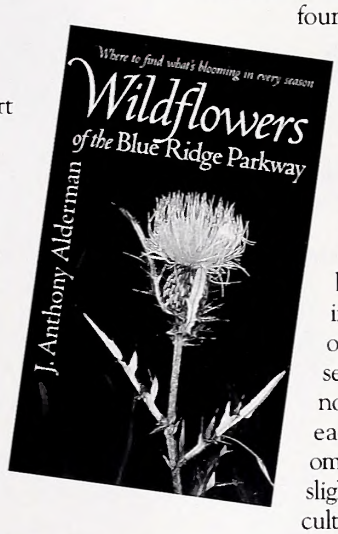
Bugfest will be held at the N.C. Museum of Natural Sciences in downtown Raleigh. The popular educational program will feature exhibits, displays and activities related to insects and arthropods. The highlight of the free event is the Cafe Insecta—where various insect dishes will be served up for tasting. For more information, call Bob Flook at (919) 733-7450.

Wildflowers of the Blue Ridge Parkway

Wildflowers of the Blue Ridge Parkway *by J. Anthony Alderman, The University of North Carolina Press, P.O. Box 2288, Chapel Hill, N.C., 27515-2288, 268 pages, paperback, 1997, $12.95.*

Snaking across the backbone of the southern Appalachian Mountains from Virginia into western North Carolina, the Blue Ridge Parkway provides millions of visitors each year a chance at hundreds of breathtaking views. Though the scenic overlooks are hard to miss, one of the Parkway's more subtle pleasures—its wildflowers—can be just as stunning if you know when and where to look for them.

Wildlife photographer and naturalist J. Anthony Alderman has produced just such a guide to some of the more common wildflowers found along the Parkway's overlooks, recreation areas and trails. More than just a traditional field guide, *Wildflowers of the Blue Ridge Parkway* is packed full of information and color photographs to help visitors find and identify more than 275 wildflower varieties.



The book is divided into two parts. The first part features a field guide with clearly written descriptions of each chosen wildflower species, organized by flower color, shape and blooming season. Tips on identification and notes on historical plant usage by Native Americans and early settlers are also included along with more than 200 color photographs of individual species.

The second part of the book details 75 of the Parkway's best wildflower viewing areas including 17 "must see" sites chosen by the author. The tour guide features a series of maps along with a brief description of each location including a list of the wildflowers that can likely be found in bloom during various seasons of the year.

One minor complaint: though the field guide portion of the book is broadly organized into sections based on flower color, the section titles are not continued on each page. This omission makes it slightly more difficult to find entries. The book is also by no means a complete index of all the thousands of flowering plants found along the Blue Ridge Parkway. Still, it is a fine guide to introduce Parkway visitors to some of the more common mountain wildflower varieties.

—*R.F.*

Wildlife Spending Pumps Billions into Economy

Hunting, fishing, bird watching and other wildlife-related recreation continued to be a powerful economic force in 1996, with participants spending $96.9 billion nationwide on wildlife recreation and supporting hundreds of thousands of jobs, according to the U.S. Fish and Wildlife Service.

This represents more than a 59 percent increase in wildlife-related spending since 1991, when the Fish and Wildlife Service last conducted its National Survey of Fishing, Hunting and Wildlife-Related Recreation.

"The survey confirms again that it is impossible to separate the well-being of our nation's wildlife and wildlife habitat from the health of our economy," said Acting Director John Rogers. "Our fish and wildlife are not just a priceless treasure we hand down from one generation to another, they are the source of jobs and growth for both the national and local economy from coast to coast."

The survey, which is conducted by the U.S. Census Bureau, showed that spending by anglers and hunters rose 69 percent during the 5-year period to $67.9 billion. Meanwhile, spending by bird watchers, wildlife photographers and other nonconsumptive participants rose 39 percent to $29 billion.

In all, 18 percent of the population ages 16 and older fished during 1996, 7 percent hunted, and 31 percent participated in nonconsumptive wildlife-related recreation, the study showed. "Millions of Americans have made hunting, fishing, bird-watching and other wildlife-related recreation an important part of their lives," Rogers said. "This year's survey confirms that Americans have a national love affair with wild places and wild creatures."

—*Information courtesy of the U.S. Fish and Wildlife Service*

Boating Course on Internet

Have you been too busy to take a boating safety class, or would you just like to brush up on your nautical skills? Now there's a free, accredited boating safety course available on the Internet.

Developed by the BOAT/U.S. Foundation for Boating Safety in cooperation with the National Safe Boating Council, the "On-line Boating Safety Course" can be found by logging on to the BOAT/U.S. web site at http://www.boatus.com.

"With this innovative, self-teaching test on the Internet, we can expose millions of people to basic boating safety, navigation and boat operator skills," said BOAT/U.S. Foundation Executive Director Jim Ellis. "It is ideal for anyone who can't attend a traditional classroom course in boating safety."

The course has been approved by the National Association of State Boating Law Administrators, the organization charged with setting education standards for boating courses. A reference guide and glossary of nautical terms are provided for the 50-question test. If an incorrect answer is chosen, the correct answer is displayed and scores are generated automatically. A passing grade (80% or higher) will be rewarded with a boating safety certificate.

—*Information courtesy of BOAT/U.S.*

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through April 1997

Principal Balance
$23,709,210.92

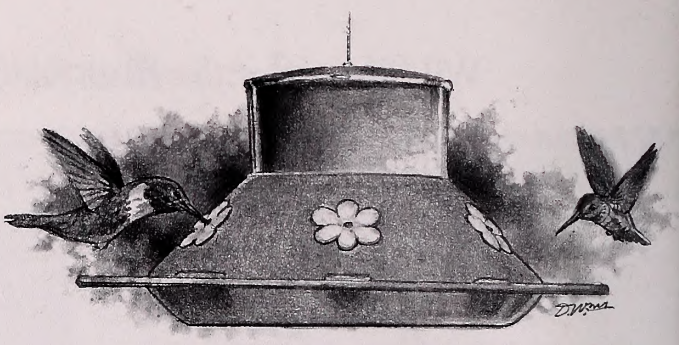
Interest Earned
$22,246,280.22

Total Receipts
$45,955,491.14

Interest Used
$10,050,660.04

Fund Balance
$35,904,831.10

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.



Birds for the Future?

by Rodney Foushee

It's mid-summer and with any luck you've already attracted some fine ruby-throated hummingbirds to your backyard. A supplement of sugar water along with some plantings of columbine, rose mallow and other nectar-producing flowers can really help attract these migrating marvels of flight.

Traditional bird feeders, water baths and the proper mix of native trees and shrubs help bring in plenty of other colorful resident and migratory songbirds to your delight. But there is something missing from this idyllic picture—the tens of thousands of birds that fail to show up each year from their wintering grounds in Latin America.

A mix of human activities along a thousand-mile path from South America to North Carolina and beyond has led to the rapid decline of dozens of familiar migratory songbird species including thrushes, warblers, tanagers and orioles. The problems are complex but include habitat destruction and fragmentation at home and abroad as well as the use of deadly pesticides in Latin American and Caribbean countries.

Thankfully, a new bird conservation guide, available through the Cornell Lab of Ornithology, gives you all the tools you need to swing into action on behalf of your favorite birds—and help to ensure their future. The 32-page booklet, titled *Citizen's Guide to Migratory Bird Conservation*, is loaded with great ideas for projects and activities you can do on your own or with a group. They include backyard habitat improvements, letter writing campaigns, joining existing conservation groups and forming new ones.

The Cornell Lab of Ornithology and the National Audubon Society published the guide as a joint project with Partners in Flight, an international conservation program for migratory landbirds. Guides are $5 each and $2 each for five or more copies. They can be ordered by writing Martha Fischer at the Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, N.Y. 14850, or call (607) 254-2440. For more information about Partners in Flight in North Carolina, contact the Wildlife Commission's Nongame and Endangered Wildlife Section at (919) 528-3374.

N.C. WILD STORE

Summer Survival Kit

A comfortable T-shirt, a hat to keep you cool, a good video or book, and you're ready to face these sweltering summer days. Just select your summer survival kit and use the easy-order form in the back of the catalog. Oh, and bring your own hammock.

Our white, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort. Three cap styles and color combinations give every cap fancier a choice.

N.C. WILD T-SHIRT

Pocketless tee has N.C. WILD logo on the front and features a colorful original design on the back. $14.50.

ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

WILDLIFE IN N.C. T-SHIRT

Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. $14.50.

ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

N.C. WILD CAP

N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. $16.50.

ITEM CODE **A1**

WILDLIFE IN N.C. CAP

Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/ stone. $16.50.

ITEM CODE **A2**

WILDLIFE IN N.C. CAP

Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. $16.50.

ITEM CODE **A3**

ALL THINGS ARE CONNECTED

Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. (See page 40 for accompanying teacher's guide.) $20.

ITEM CODE **W1**

DOGS THAT POINT, FISH THAT BITE

Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. $19.95.

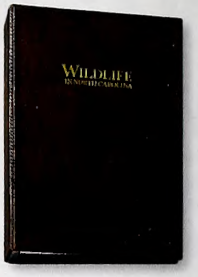
ITEM CODE **M8**

More terrific items ☛

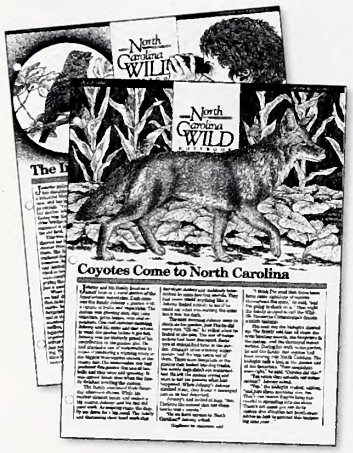
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE

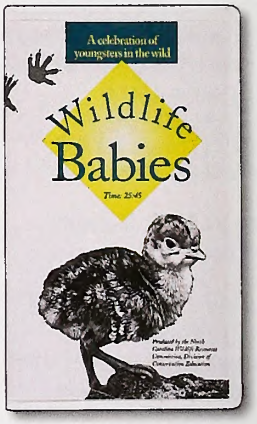
Wildlife in North Carolina Book
The best of *Wildlife in North Carolina* magazine. $12.
ITEM CODE **M3**



Wildlife in North Carolina Magazine Binder
Store 12 issues of the magazine in this sturdy binder. $10.
ITEM CODE **M2**



N.C. WILD Notebook 1995-1996
Eight issues of *North Carolina WILD Notebook*, the Wildlife Commission's prize-winning conservation-education newsletter. $3.
ITEM CODE **E11**



Wildlife Babies
Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20.
ITEM CODE **N9**

Value Buy!
Buy the set and save.

Lizards of N.C.
Shows all 12 of the state's lizard species. 22" x 34". $6.
ITEM CODE **P3**

Turtles of N.C.
Shows all 21 of the state's turtle species. 22" x 34". $6.
ITEM CODE **P4**

Snakes of N.C. (Livebearers)
Shows all 17 of the state's livebearing snake species. 22" x 34". $6.
ITEM CODE **P5**

Snakes of N.C. (Egglayers)
Shows all 19 of the state's egg-laying snake species. 22" x 34". $6.
ITEM CODE **P8**

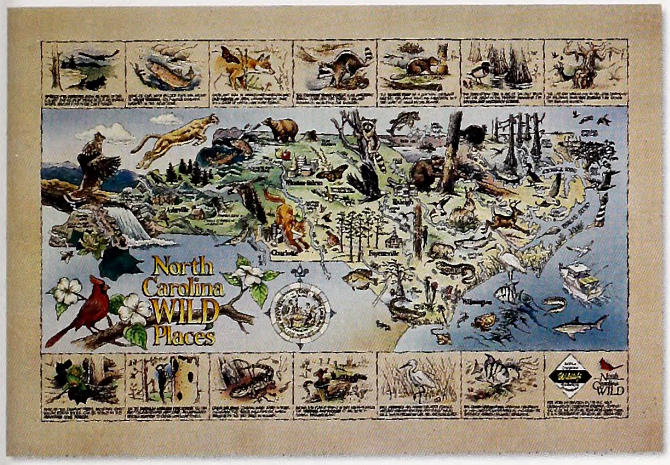
Set of 4 Posters
You'll save $6 by purchasing the set of four posters above. $18.
ITEM CODE **P10**

Value Buy!
Buy the set and save.

N.C. Freshwater Fishes
Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6.
ITEM CODE **P6**

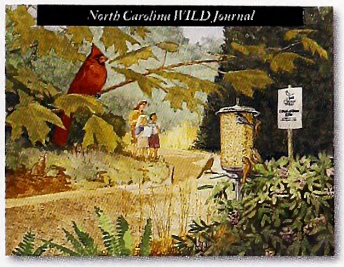
N.C. Marine Fishes
All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6.
ITEM CODE **P7**

N.C. Freshwater Fishes And N.C. Marine Fishes
Save $2 when you buy both posters as a set. $10.
ITEM CODE **P9**



North Carolina WILD Places Map

Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4

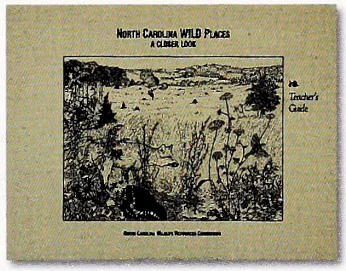


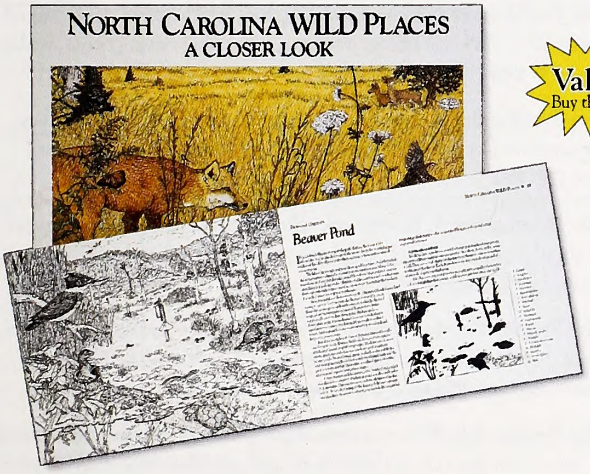
North Carolina WILD Journal

Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

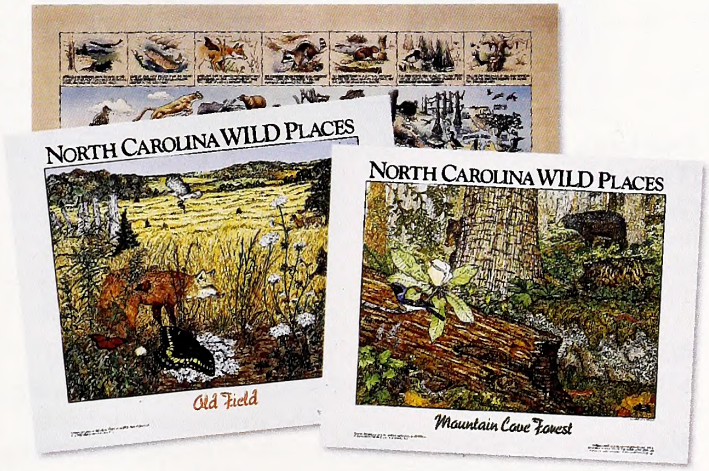
North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7





Value Buy!
Buy the set and save.



North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places book and posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16.
ITEM CODE E6

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look.* 19½" x 16". Shipped folded with poster version of WILD Places Map. $8.
ITEM CODE E5

Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.

Cub & Boy Scout Correlation.
ITEM CODE E9

Girl Scout Correlation.
ITEM CODE E10

Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.

This Land Is Sacred (Teacher's Guide)

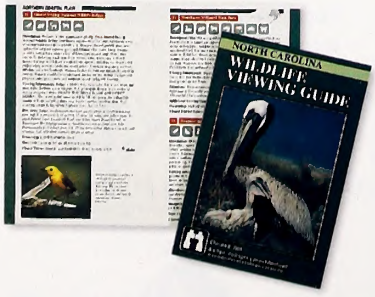
Classroom activities to accompany the All Things Are Connected video. $4.50.
ITEM CODE **W2**

All Things Are Connected

(Video sold separately on page 37.)

All Things Are Connected & This Land Is Sacred

Video and Teacher's Guide package. $22.
ITEM CODE **W3**

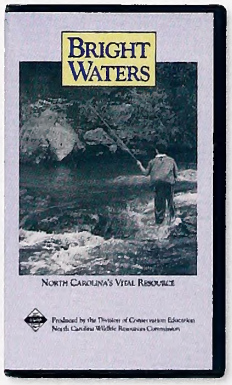


North Carolina Wildlife Viewing Guide

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95.
ITEM CODE **N6**

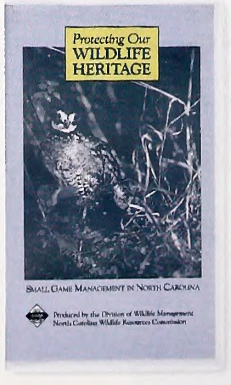
Gardens for Butterflies

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2.
ITEM CODE **M5**



Bright Waters (Video)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20.
ITEM CODE **N7**



Protecting Our Wildlife Heritage (Video)

25-minute video offers useful tips for landowners on managing small game. $20.
ITEM CODE **N8**

WILDlife Profiles

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. $2 ea.

WILDlife Profiles Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard.
ITEM CODE **W4**

WILDlife Profiles Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar.
ITEM CODE **W5**

WILDlife Profiles Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, large-mouth bass, black crappie, channel bass. ITEM CODE **W6**

WILDlife Profiles Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon. ITEM CODE **W7**

WILDlife Profiles Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE **W8**

WILDlife Profiles Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE **W9**

WILDlife Profiles Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab. ITEM CODE **W10**

WILDlife Profiles Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE **W11**

WILDlife Profiles Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE **W12**

WILDlife Profiles Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE **W13**

WILDlife Profiles Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE **W14** NEW

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (_____) ___-____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____-____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

➜ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
➜ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
➜ (N.C. residents add 6% sales tax.) ..... **TAX**	$
➜ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
➜ (Add all items above.) ..... **TOTAL**	$

For credit card orders, provide information below.

CREDIT CARD NUMBER

EXP. DATE

( )
Daytime Phone Number

Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

- ☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
- ☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (___) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

_ _

N.C. Wildlife Resources Commission Merchant #843007550

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

VISA

MasterCard

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ _ _ _ _ _ _

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

Wildlife Commission Spotlight

HIP: New Program Charts the Harvest

What's HIP? In the fall of 1997, North Carolina will be phased into a nationwide program–the Harvest Information Program (HIP)–to provide harvest information on migratory game birds. This program, required by the U.S. Fish and Wildlife Service, is already being implemented in many other states. All states will be participating in 1998. Starting this coming hunting season and each year thereafter, migratory game bird hunters in North Carolina will be required to have a certification printed on their hunting license. To obtain the certification hunters must annually complete a HIP questionnaire and declare if they plan to hunt migratory birds.

KEN TAYLOR

Why collect harvest information? HIP will give biologists better harvest information to understand fully the impact of hunting on wildlife resources. Inadequate information has been used to legally challenge hunting seasons in some states. The U.S. Fish and Wildlife Service's survey of hunters who purchase federal duck stamps yields waterfowl harvest information, but the precision of these estimates can be improved. Also this survey does not include approximately 2.3 million hunters of doves, woodcock and other migratory game birds.

MELISSA McGAW

How will the HIP Program Work? The N.C. Wildlife Resources Commission's new Customer Support System will allow hunters to complete the HIP questions and receive their HIP certification at any license agent at no charge. Lifetime license holders will be mailed a post card. They will be requested to return the card indicating they plan to hunt migratory birds in order to become certified. All licensed hunters of migratory game birds, which includes waterfowl, dove, woodcock, rail, snipe, gallinule and moorhen, will be required to participate.

MELISSA McGAW

KEN TAYLOR

Cooperation and support from hunters make sound resource management possible. The Wildlife Commission supports this program and asks for the support of our sportsmen. For more information, call (919) 733-7291.

Beauty on the Beach

This Atlantic cockle on a tidal flat reminds us that few states share North Carolina's unique topography from the coast to the mountains. From the dunes at the Kitty Hawk Coastal Reserve across North Carolina into the mountains, the Natural Heritage Trust has saved thousands of acres of our priceless landscape. For the story, look inside.

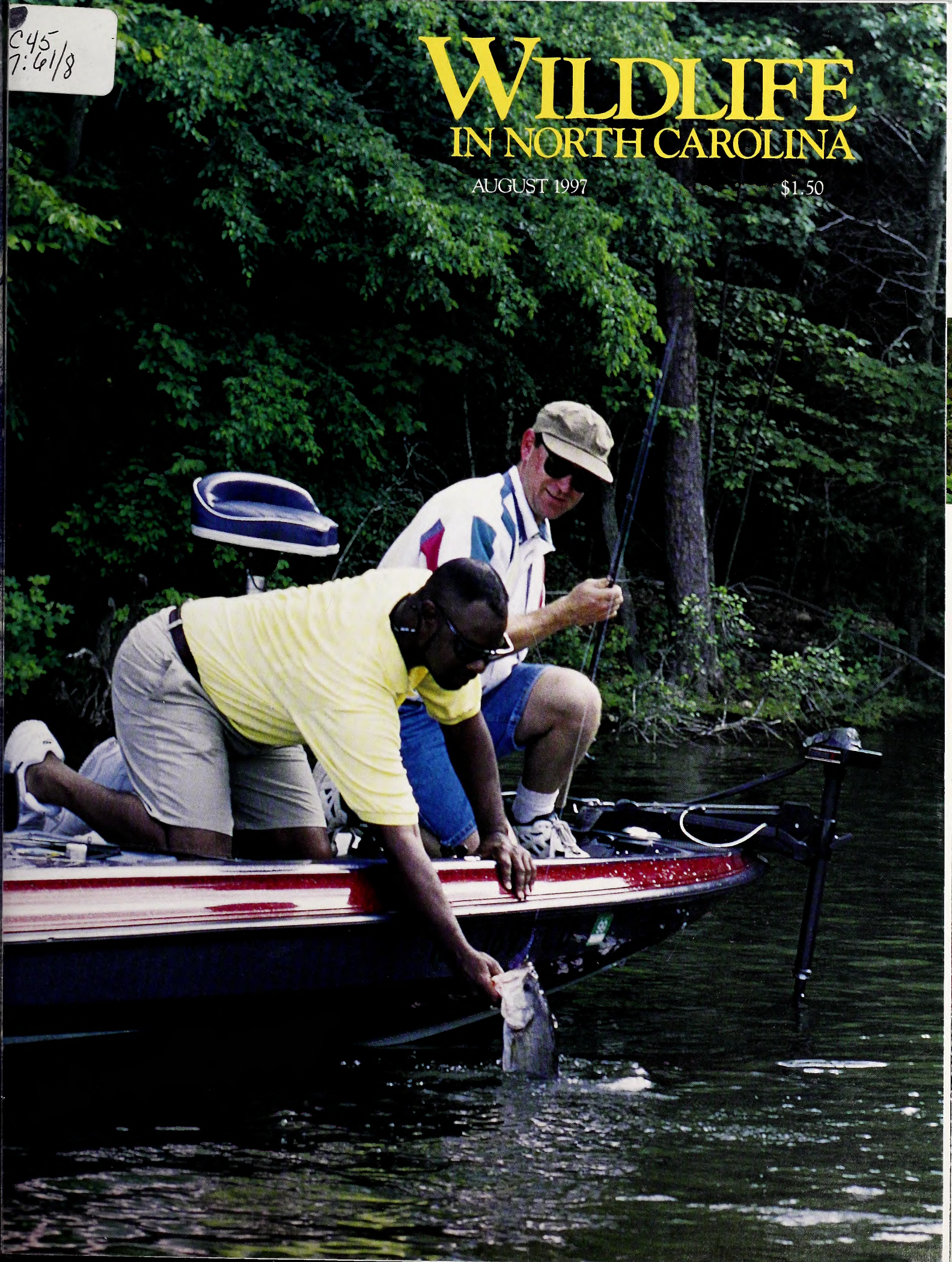
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:61/8

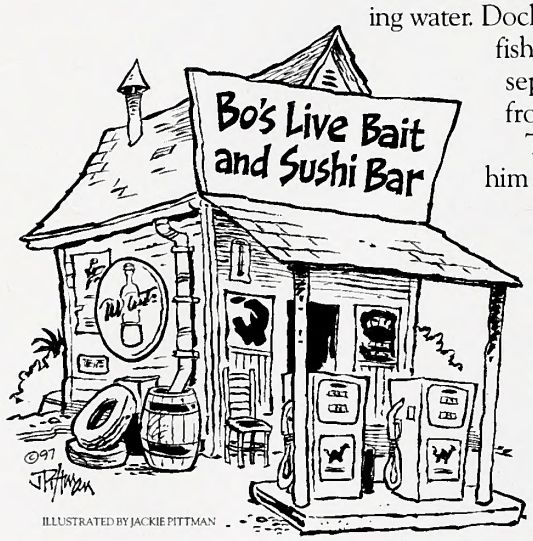
WILDLIFE IN NORTH CAROLINA

AUGUST 1997 $1.50



A Good Bait, But Not a Great Bait

by Jim Dean



ILLUSTRATED BY JACKIE PITTMAN

It has been something over 40 years since I got my first lesson in the multiple personalities of certain fish baits. I was about 11 or 12 that summer, and we were spending several weeks, as we did each summer through the 1950s, at an old cabin built on pilings in the mouth of the Little Alligator River. The cabin was a ramshackle affair that squatted low over the black, dancing water. Docks and walkways surrounded it where we tied up the old juniper skiffs we used for fishing or for travel to and from Fort Landing three miles away. Walkways led to the separate cook shack and to the outhouse. Of course, we had to bring all our supplies from the mainland except for water which was collected in a rain barrel.

That trip, my grandfather's older brother John Fielding Dean—that would make him my great uncle, I guess—was with us, but he didn't generally join us for the all-day boat trips to fish for white perch, robin or bass. Instead, each morning, he would drag a chair out beside the cook shack and sit there fishing for catfish. He caught some channel cats, but what I remember best was his bait. He had brought a supply of tinned meat called Treat (a cousin to Spam). He'd slice off a thick slab and put half of it on the hook. Then, he'd eat the the other half. I was impressed.

That isn't surprising considering that catfish bait has traditionally consisted of such things as chicken guts, ripe liver, blood-soaked cotton wads, doughballs flavored with anise, even chunks of Ivory soap. Certainly, it's not fare normally regarded as suitable for humans. And keep in mind that this was years before the popularity of sushi and calamari confused this issue. At the time, I simply admired Uncle John for his eccentric and economical approach.

At the time, I simply admired Uncle John for his eccentric and economical approach.

Years later when I was living in Alamance County, I began catfishing on the old Graham city lake with Bill Adams and discovered that my great uncle's sense of thrift was alive and well. Bill's favorite bait was ocean shrimp, kept cool and fresh on ice. We caught lots of blue and channel cats on shrimp, and the leftover bait was routinely brought back home to be fried and served with the sweet, flaky filets of catfish.

This business of fishing with edible bait makes good sense, especially if there's a fair chance that you're not going to catch anything, but you should know that it's not foolproof. Most ocean panfish such as spots, pompano and sea mullet love shrimp, and they prefer it when it's fresh enough for human consumption. Yet, there have been far too many times when I ruined the better part of a $20 bill to purchase a couple of pounds of fresh shrimp only to find that I was trading it piecemeal for an ankle-deep pile of skates and dogfish. That would strike most of us as a poor business arrangement.

I have run into a similar situation using strips of flounder belly as bait for flounders. Flounder belly works great, assuming that you have a flounder to begin with. However, it's important to make sure that you are getting some return on investment. If you're not judicious in your use of strips—that is, if it takes a whole flounder to catch another—you can easily find yourself at the end of the day with nothing to show for your efforts but a pile of skeletons. Sad to say, I have done this. I think it's called sportfishing.

Squid is commonly used bait that some people call calamari and regard as edible. (If you haven't tried it, imagine a platter of chewy, fishy fettucine). A strip of fresh squid adds a powerful attractant when hooked as a trailer behind a jig, and lots of prime gamefish such as sea trout and flounder love it. Squid, however, spoils quickly, thus it is not likely to add anything to your post-trip meal if it has spent the day in a baitbox.

The other potential problem with routinely eating bait is that you run some risk of losing your sense of discrimination. I'm not naming any names, you understand, but I have it on reliable authority that an angling acquaintance once picked up his date to go to a movie. She had apparently just bathed and emanated the brisk, clean smell of Ivory soap.

"Gee," he is reported to have remarked while searching for a compliment. "You look terrific. And you smell just like my favorite catfish bait."

That's when he learned that baited breath is not the same as abated breath.

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

John F. Lentz/Chairman/Ellerbe
Bobby N. Setzer/Vice-Chairman/Cullowhee
C. J. Belch Jr./Roper
Jim Bennett/Greensboro
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
Junior Dew/Hallsboro
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John E. Pechmann/Fayetteville
Charles R. Preston/Conover
Eugene Price/Goldsboro
R.G. Sowers III/Burgaw
J. Ralph Squires/Charlotte
Jerry W. Wright/Jarvisburg

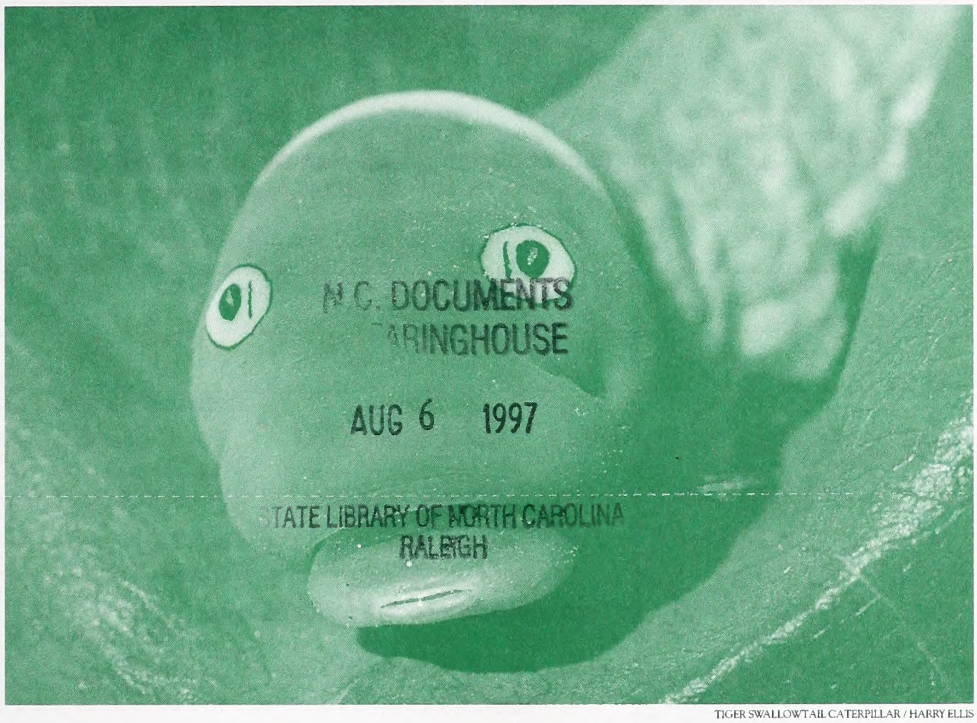
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants



TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, in October we'll include a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS

MAGAZINE SUBSCRIPTION ORDER FORM

SUM97

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.**
(If renewal, attach recent magazine label.)

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
first name MI last name area code

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** **$**

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** **$**

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** **$**

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE ( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

Contents

Wildlife in North Carolina

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

August 1997 *Volume 61, Number 8*

Features

4 **Harry Ellis: Native Naturalist**
written by Elizabeth Hunter ©1997
photographed by Harry Ellis ©1997
At first glance, there might be nothing to distinguish this retired Mitchell County machinist from any other mountain native. But self-taught Harry Ellis has become a highly respected naturalist and wildlife photographer.

page 4

page 10

8 **A Harry Ellis Portfolio**
A thorough knowledge of nature and photography marks the fine photographs taken over the years by Harry Ellis. Here's a sampling from this long-time contributor to Wildlife in North Carolina.

10 **Jordan Lake Bass: The Tourniquet That Worked**
written by Dan Kibler ©1997
The bass fishing was going down the tubes in newly flooded Jordan Lake back in the mid-1980s until hopeful wildlife biologists tried a simple remedy. Now, Jordan is one of the best bass lakes anywhere.

14 **A Flight of Spirit** *written and photographed by Mike Gaddis* ©1997
The soul of traditional archery is its artistry, and it can be at once plain or profound.

page 14

22 **Dove Potion Number Nine**
written and photographed by John Crew ©1997
Who knows for sure what a mourning dove thinks when it sees a wooden facsimile of itself?

26 **Floating 'n Fishing** *written and photographed by Gerald Almy* ©1997
Fishing while drifting down a river is wonderful sport. Here are 12 tips that will make sure your trip is perfect.

Departments

Our Natural Heritage *by Jim Dean*
Nature's Ways *by Lawrence S. Earley*
Back Porch *by Rodney Foushee*
Wildlife Through the Year *by Rodney Foushee*
Cover *Bass fishing on Jordan Lake. Photographed by Melissa McGaw.*

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

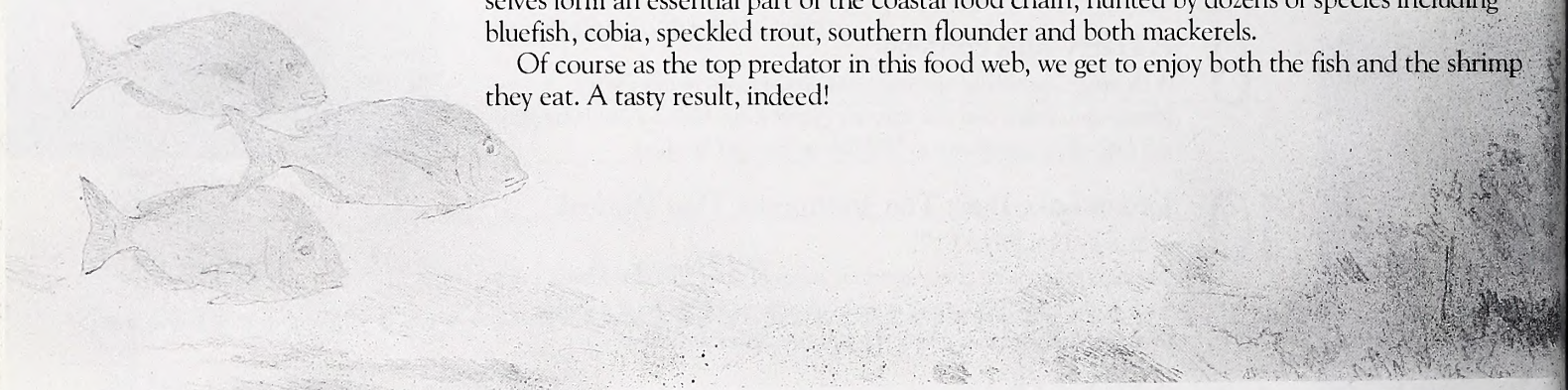
Our Leggy Crustaceans

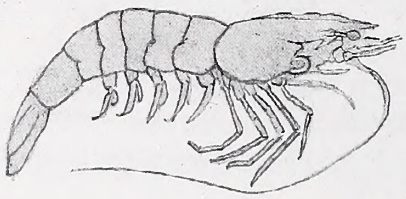
written by Lawrence S. Earley
illustrated by David Williams

Twenty legs is a lot of legs, but for North Carolina's shrimp, it's just enough. Ten of them are for walking, and five pairs enable them to swim fairly long distances when they migrate seasonally. Though we often think of shrimp as a single species, there are actually three—the brown, pink and white shrimp—that form one of the state's most lucrative fisheries. Shrimp landings in 1996 were worth $13.4 million.

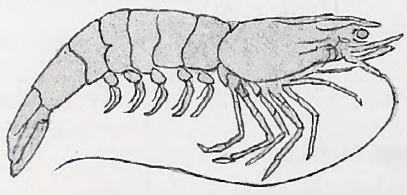
Shrimp figure prominently in the ecology of the coastal region. Their life cycle is split between the offshore coast, where they spawn as adults, and their estuarine habitats into which they move as juveniles and in which they mature. Beginning in March and ending perhaps in August, larval shrimp are carried by wind and currents into marshes in the sounds and lower rivers of the coast, becoming bottom feeders. As omnivores, they fatten on a variety of plant and animal foods, among them microscopic bits of detritus (dead marsh grass), the basis of the marsh food web. They themselves form an essential part of the coastal food chain, hunted by dozens of species including bluefish, cobia, speckled trout, southern flounder and both mackerels.

Of course as the top predator in this food web, we get to enjoy both the fish and the shrimp they eat. A tasty result, indeed!

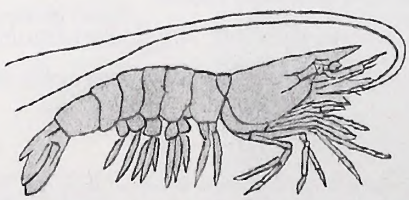




Brown shrimp (Penaeus aztecus) *generally prefer deeper waters of high salinity in which to spawn. They are harvested in North Carolina from June to October, peaking in August. In cold temperatures, they can burrow into the muddy bottoms.*



Pink shrimp (Penaeus duorarum) *also prefer high-salinity spawning waters. They enter the estuaries in June and July and move out to the offshore area in the fall or following spring. They may overwinter in the estuaries by burrowing.*



White shrimp (Penaeus setiferus) *like more brackish water than either of the other shrimp species. The whites migrate southward along the coast as mature adults, seeking warmer waters, and can be found in North Carolina's estuaries from July through November.*

Other Reading

- Todd Ballantine, *Tideland Treasure* (Deerfield Publishing, 1983).
- Judith M. Spitsbergen, *Seacoast Life : an Ecological Guide* (Raleigh, 1980).

Surfing the Web

- The University of Georgia Museum of Natural History provides a site showing a profile of a marsh with various natural communities and their species highlighted. There are also links to other sites. *Address:* http://service.uga.edu/natmus/marsh/marsh.html

Shrimp congregate in *large schools which protect them somewhat from predators. They are mobile crustaceans, moving from spot to spot in the sounds searching for food. Once they are fully grown and move into the offshore regions to spawn, they may migrate long distances propelled by their swimming legs.*

Shrimp inhabit two *very different habitats during their lives. The mature females lay their eggs (as many as 1 million) in offshore waters where they hatch within 10 to 12 hours (1). Molting five times over the next 24 hours (2), the larvae are carried by prevailing currents toward estuaries for the next 10 days or so during which they develop through six further stages. Now known as postlarvae, they float (3) on incoming tides into the quieter waters of the estuaries (4). In* Spartina *and* Juncus *marshes, the shrimp feed and grow (5, 6, 7). As they grow larger, they move out of the estuaries as mature adults and into the offshore waters where they spawn and eventually die (8).*

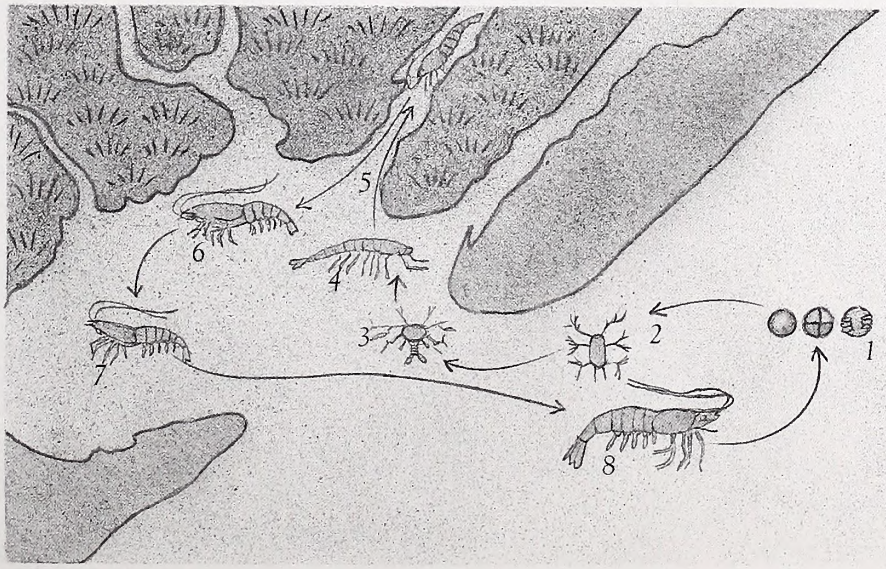


Illustration after Wayne Wescott, *A Guide to Recreational Shrimping* (UNC Sea Grant, 1986)

Harry Ellis: Native Naturalist

MELISSA McGAW

At first glance, there might be nothing to distinguish this retired Mitchell County machinist from any other mountain native. But self-taught Harry Ellis has become a highly respected naturalist and wildlife photographer.

written by Elizabeth Hunter ©1997
photographed by Harry Ellis ©1997

Were you to pull up next to Harry Ellis just stepping out of his car, camera in hand, at a Blue Ridge Parkway overlook, you'd probably take him for a tourist. Or you would until you asked him the way to Grandfather Mountain, and he answered in his slow, rich mountain drawl. Then you'd take him for a local on a Sunday drive. But you'd have to think again if you accompanied him up a trail, paused with him at a rotting stump, followed his eye to a cluster of mushrooms like tiny parasols on toothpick stems, and exclaimed involuntarily, "What's that?"

Because Harry Ellis would tell you: the mushroom's common name, its Latin name, and, if you were interested, a great deal more—about the species in question and mushrooms in general. He'd explain how, in mushrooms, what you see aboveground is only the fruiting body. The true plant—the mycelium, a mass of pale, threadlike filaments—is underground.

He wouldn't make the comparison, but you might—how the true Harry Ellis is concealed beneath an ordinary exterior. You'd make it again if he invited you to his house. He might pull out the thick notebook filled with slides of the 400 species of mushrooms he's photographed, or show you some of his mushroom pictures in field guides. But you wouldn't see a blowup of any of the hundreds of his photographs that have appeared in *National Geographic*, *National Wildlife* and *Wildlife in North Carolina* hanging on the wall.

Nor would you see a framed diploma.

***Harry Ellis delights** in capturing insects like this tiger swallowtail* (Papilio glaucus) *on film. The photographer prepares to shoot a closeup of springtime trilliums (facing page).*

When Ellis submitted the first of more than three dozen articles published in *Wildlife in North Carolina*, written in his beautiful cursive style, editor Jim Dean assumed from its content and the elegance of its prose that its author "was probably a retired humanities professor from somewhere like Cornell who had moved to western North Carolina to pursue a hobby of wildlife photography." But he's not. A native and lifelong resident of Mitchell County, Ellis graduated from high school but "didn't have any college. Money was a little scarce in that day." Instead, he went to work as a machinist at local textile and furniture factories, an occupation he followed until retirement.

Still, no university could have furnished a finer education than Ellis has provided himself. His major? What he refers to as "the great web of life." His laboratory? "The green world of nature, lying just beyond our doors." Among his friends and neighbors he's known as the man to call when you have a plant or animal you can't identify. But he fears that his "habit of lying in thickets peering though camera viewfinders at spiders and digger wasps and other creatures" has earned him a reputation as "somewhat of an eccentric." Those who know the story of the day Ellis excused himself from Sunday dinner to photograph a praying mantis enjoying *its* Sunday repast (a cicada that kept on singing as the mantis excavated its back) must certainly believe him odd.

Ellis can't remember a time when the natural world wasn't his Pied Piper. He

recalls "taking down the big school dictionary and copying out everything I could find about animals and plants, when I was in third or fourth grade." What triggered his passionate interest remains as mysterious to him as monarch migration, whether slime molds are plant or animal or something else, or how a mud dauber knows where to inject its venom to paralyze but not kill the spiders it stores as living food for its young.

He feels fortunate that his father, Jeff Ellis, a farmer, took him on overnight camping trips, where he sat around the campfire watching the moon rise through the trees and listening to calls of the night birds; that his mother, Effie Duncan Ellis, "loved nature close to home." Perhaps Ellis the naturalist was born at age seven, when the family moved to a house near a woodland pond. There he spent countless hours fishing with a pole he cut from an alder, turning over rocks to watch the caddis worms, mayfly larvae and salamanders whose lives continue to enchant and absorb him. "I still have much of that 7-year-old boy in me —inside a man who can feel the snows of winter coming on."

A *terrestrial snail* *feasts on a scarlet mushroom. Closeups of nature's small creatures and plants are typical of Harry Ellis's photographic interests, reflecting his belief that many of nature's greatest mysteries lie unobserved at our feet.*

During his more than threescore and 10 years, the natural world has proved an endless source of wonder. "A world in which there were no mysteries, where everything was known, with nothing unsolved, would be static and dull," he says. At the same time, nature keeps him humble. A lifetime of study has barely allowed him "to scratch the surface. If you know anything about nature, you realize that your own ignorance is almost boundless." He likes Jean Henri Fabre's observation that "human knowledge will be erased from the archives of the world before we possess the last word about even a gnat." It's not surprising that he admires the French entomologist. They have much in common. "Fabre kept within 10 miles of home, but within his garden walls, as a stay-at-home naturalist, he did more work than dozens of laboratory scientists," Ellis says.

I've lived in Mitchell County for 20 years but had never laid eyes on Harry Ellis until a night three or four years ago when he gave a program for the local historical society. The library meeting room was full to overflowing when he appeared: a will-o'-the-wisp of a man, short, bald, bespectacled, clad like a country preacher in a white shirt and dark suit. Then the room was plunged into darkness, split a moment later by a brilliant landscape—a country church surrounded by lichen-covered gravestones against a sky of that deep blue the heavens achieve on crystal-clear days in October. A deep, gravelly voice rumbled forth, deliberate as wagon wheels on a dirt road. As images flared, the voice spun a tale of the mountains we live among but had never before seen quite so precisely. A spiderweb jeweled with dew; a millipede crawling across brown oak leaves; a forest carpeted with trillium; fall foliage red as fire; monarchs in every life stage from egg to butterfly. Threading the images together, the wonderful, rich voice, choosing words as meticulously as the camera had been focused and the images composed.

After the program, I introduced myself. "Your slides were stunning," I said, "but I especially enjoyed the monarch series because I banded them as a child for a researcher who was trying to find out where they went for the winter."

Ellis' head swiveled; his gaze locked on me like a praying mantis eyeing a katydid. "Why, that would have been Dr. Fred Urquhart of the University of Toronto," he said. "Associates of his discovered the eastern band of monarchs' overwintering sites in central Mexico in 1975." I gaped. Most people look dubious at my mention of banding butterflies. Ellis not only knew what I was talking about, he could pull the name of the researcher, and the date the research goal was achieved, out of his hat. We've been friends, I think, from that moment.

Ellis would wave a deprecating hand at this story. He doesn't think his technical excellence with the camera ("anybody can learn that out of a book," he says dismissively), his verbal grace, or the vast storehouse of information he's amassed—including the scientific names for thousands of plants and animals, and their life histories—are worth mentioning. Not when the greater mysteries of mantises and monarchs and mud daubers are crying for attention.

"Harry," I asked once when he lapsed unconsciously into the Latin names while describing the difference between the rare Blue Ridge goldenrod and one of its common cousins, "Do you spend evenings memorizing the scientific names for all the spiders and mushrooms and plants you know? How do you *remember* them?"

"Well," he said matter-of-factly, "lots of them don't even *have* common names. And sometimes the same common name is used for a half dozen different things. If you use the scientific name, you always know what you're talking about. And anyway, when you become familiar with a subject, the scientific names get into your mind and stick there—like kitchen words." I took this as a kindness from a man who might mistake a blender for a food processor. He wouldn't make that kind of error outdoors; accurate identification is an essential tool of his trade. "If a nature photographer can't identify what he takes pictures of," he says, "his photographs are, for all practical purposes, worthless."

Ellis' divides his outdoor life into two phases. In his 20s and 30s he was a dedicated sportsman, with a passion for trout fishing. Though many of his fishing companions "have passed to that Great Beyond," he harbors fond memories of them, of days "when the future seemed to stretch out forever and no hill was too steep to climb."

Eventually, he "put down the rod and reel and picked up the camera." His first, a Brownie, was a Christmas gift from his sister

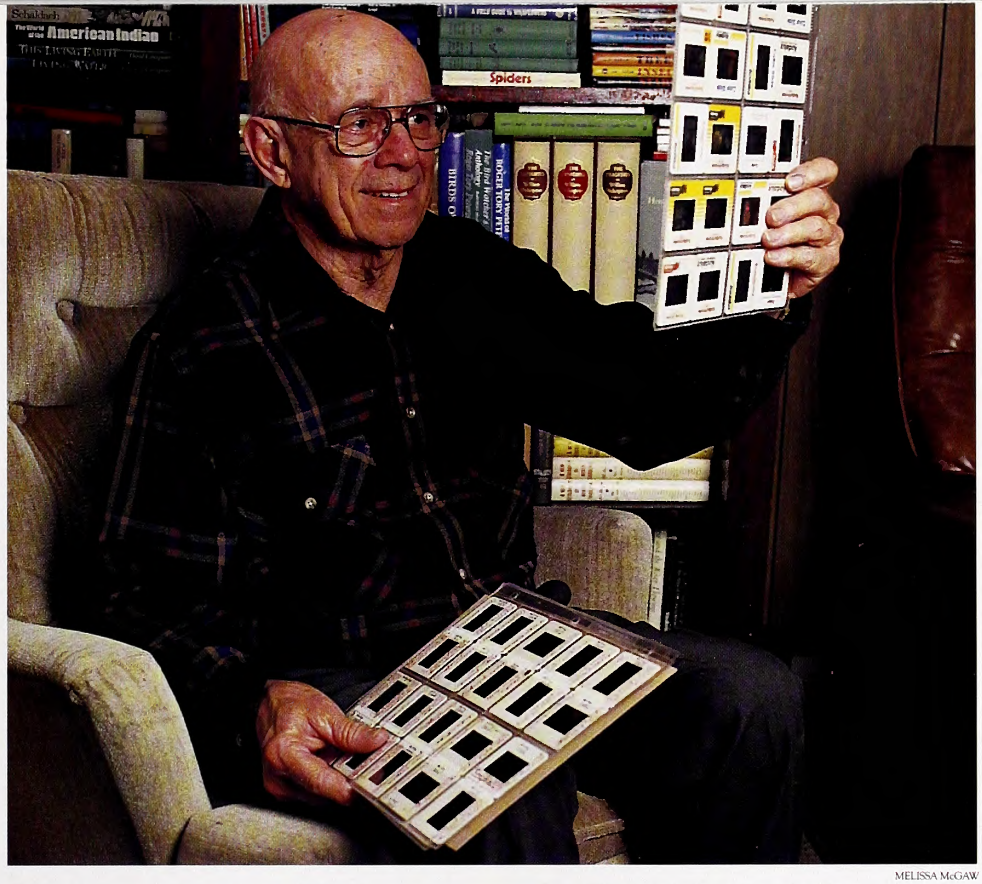
Helen. "I started taking pictures of some of the most common wild creatures around the place where we lived," he recalls. "It was a very simple camera with a lens that didn't focus close enough for most of the subjects I tried to photograph, like butterflies and flowers, and the slow shutter speed resulted in blurred pictures of moving birds and animals."

Although his early photographs were mostly throwaways, the Brownie made "an impression that never left me, and paved the way for a future of enjoyment in photography." Today he relies on a Canon F-1, a 70-210 zoom, a 50-mm macro lens for close-ups, and Kodachrome 64 or Fujichrome Velvia 50 film. He uses Canon equipment "because I started with it." He doesn't believe there's "a dime's worth of difference" between leading manufacturers' top-of-the-line cameras. "Basically, photography is the art of seeing. A camera is only a tool to interpret what you see," he says. "It's the eye behind the camera—knowing when to press the shutter and when not to—that makes the difference."

There's a permanence to photography that Ellis appreciates. "All the animals and birds that I have photographed are now dead. But when you photograph them, you give them a little immortality. Somebody said that when you photograph birds, they fly on forever."

His late wife, Ruby Hughes Ellis, and his son Mike accompanied him on many photographic forays, but his most frequent companion was the late Carter Hudgins, a Marion attorney, amateur naturalist and photographer. Together they suffered mosquitoes, poison ivy, cloudbursts, wet feet and long trudges to out-of-the-way places. "You have to have the patience of Job and a willingness to endure torture to be a good wildlife photographer," Ellis says. "I still go out in the field with various people, young and old. I can tell who's going to make a good photographer and who isn't. There are people who'll say, 'Well, I'll never go back to that place again,' after an expedition on which nothing of interest turns up. The mark of a photographer is an eagerness to go back again and again."

Luck is a big element in nature photography, Ellis says. "The great wildlife photographs I've missed would fill a big book—the most beautiful deer shots, for instance—missed because I didn't have the right lens on, or because I took too long to get set up. Being in the right place at the right time is two thirds of the battle." He cites his oft-reproduced photograph of a fishing spider with a just-captured minnow. "It's one of the most successful pictures I ever made. If I hadn't been ready at that particular instant, I would never have gotten it. Ann Morton, an authority on spiders, told me she'd seen it published a hundred times." Ellis laughs. "Well, it hasn't been published *that* often—maybe a dozen times."



MELISSA McGAW

***Ellis's knowledge of** biology and photography is self-taught. His biological knowledge blends with his technical know-how to produce a rare commodity—a photographer-naturalist.*

Ellis photographed the fishing spider and its prey within "a short distance of where I live." Indeed, he's taken most of his pictures within a relatively narrow range: from the Great Smoky Mountains to Grandfather Mountain. The Blue Ridge Parkway and Roan Mountain are two favorite haunts. He thinks nothing of hiking several miles to photograph a single clump of flowers if it's a species he needs for his phenomenal collection. The work of 30 years is tucked away in three drawers in a living room secretary. To a man who asked him what method he used to keep track of his slides—a computer perhaps?—Ellis responded in the negative. He uses "the yellow box system," storing all but his mushroom slides in the little Kodak boxes they arrive in from the processor. A photographer before he was a writer, Ellis first wrote prose consisting of little more than slide identification—and amplification. Perhaps editors noticed his felicity of phrasing in those amplifications; it wasn't long before they were requesting stories to accompany his photographs.

Ellis' bookcases bulge with guides and coffee table books in which his photographs appear, the works of his favorite writers—Thoreau, Fabre, Muir, Donald Culross Peattie, John Burroughs, Loren Eiseley, W.H. Hudson, Rachel Carson and Archibald Rutledge—and dozens of other naturalists. Though he claims to be more of a book collector than reader, his fondness for quoting favorite naturalists suggests otherwise. There's his rejoinder, for instance, to the trillium expert who advised him to choose a field in which to specialize—anathema to a generalist like Ellis. "I believe it was John Muir who wrote, 'When we try to pick out anything by itself, we find it hitched to everything else in the universe.'"

Once Ellis became a serious photographer, he "really had two jobs. I spent eight hours at work, came home, ate supper and spent about four hours in the woods." Weekends also found him afield. He agrees with 19th-century English writer Richard Jefferies, who wrote of time spent in the open: "These are the only hours that are not wasted. This is the real life and all else is illusion, or mere endurance."

In earlier years he yearned to visit "far off lands to photograph exotic wildlife. I would have liked to visit jungles, the wilder places of the earth." But he doesn't feel that urge anymore. He's found exotica aplenty out his backdoor. "I have had my days in the sun, days that have been an amazing experience," he says. "I believe that those who have their roots in nature, who are concerned with life and the mysteries of the earth, are the people who are most wholly content, almost never bored or weary of life. When the time ever comes that I must lay down my camera, there will be no great regrets." ⊠

A Harry Ellis Portfolio

A thorough knowledge of nature and photography marks the fine photographs taken over the years by Harry Ellis. Here's a sampling from this long-time contributor to *Wildlife in North Carolina*.

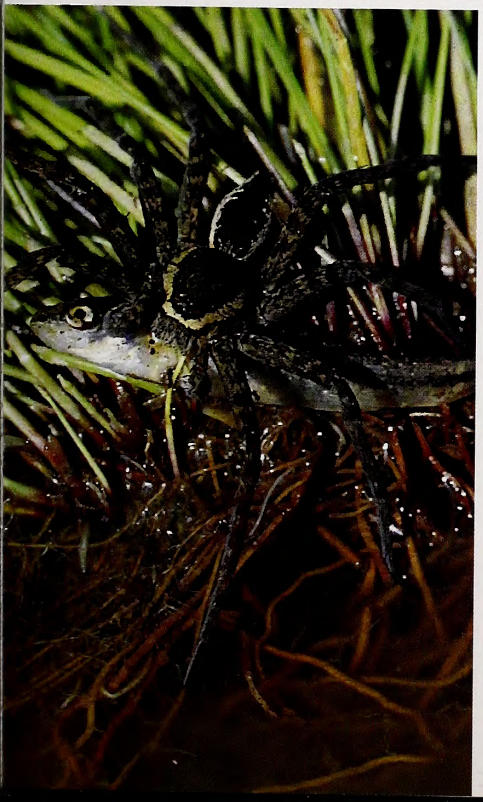
Ladybird beetles on common dandelion.

White-footed mouse eating sumac berries.

Red salamanders.

True katydid resting on a maple.

Fallen autumn leaves by a small mountain stream.



Fishing spider and tiny captured fish.

Monarch butterfly.

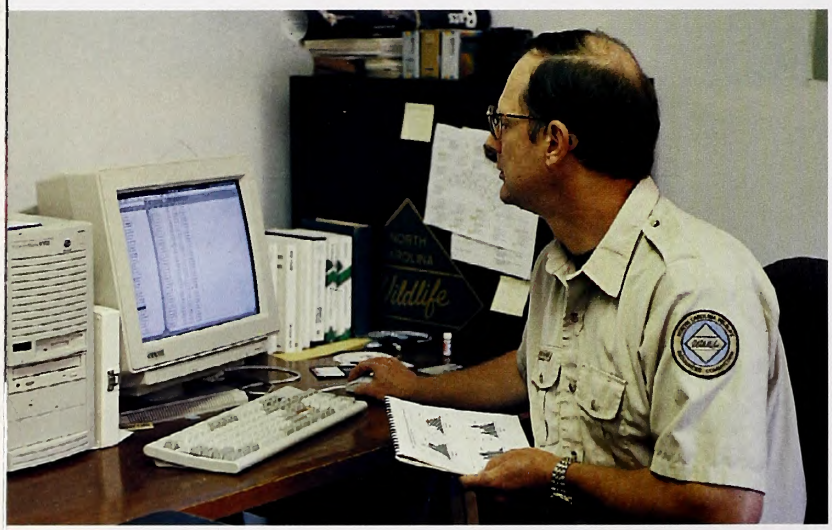
Jordan Lake Bass: The Tourniquet That Worked

The bass fishing was going down the tubes in newly flooded Jordan Lake back in the mid-1980s until hopeful wildlife biologists tried a simple remedy. Now, Jordan is one of the best bass lakes anywhere.

written by Dan Kibler ©1997

When B. Everett Jordan Lake was finally impounded in 1984, bass fishermen must have thought they'd found a heaven on earth.

The first few years, it was nothing for a pair of average fishermen, beating the banks with a variety of lures, to land 100 largemouth bass in a day's time. Although most of the bass were small—from 8 inches to 2 pounds—it was clear that Jordan was going to become something special.



KEN TAYLOR

"We put the size limit in place because, if you're not getting many new fish every year, it means you can protect what you are getting and let 'em pile up on each other."

Scott Van Horn
Fisheries biologist

Abruptly, however, the honeymoon ended. "Where did all the bass go?" fishermen lamented. Almost overnight, the bass disappeared. There were no bigger fish and few of the little bank runners that had been fooled by countless spinnerbaits, crankbaits and plastic worms in the mid-1980s.

When biologists with the North Carolina Wildlife Resources Commission conducted electroshocking surveys on the lake in the spring of 1988, they agreed that something, indeed, appeared to have gone wrong. Samples uncovered very few small bass in the shallows. Two entire year classes appeared to be missing.

"I thought we had a problem," admitted Scott Van Horn, a fisheries biologist who is the Commission's research coordinator for the Piedmont and an expert on reservoir fisheries. "In retrospect, it's possible that we had some sampling problems, but, for whatever reason, we were missing a lot of young bass."

Van Horn suspected that Jordan's bass might have completely failed at spawning attempts for a couple of years, a hypothesis that accounted for the startling lack of young-of-the-year and two-year-old bass in the electroshocking surveys. So he suggested that the Commission put in place a strict harvest regulation that might protect what few small bass had survived. Van Horn believed that might be a hedge against the problem for a year or two.

At the time, he described his suggestion of a 16-inch size minimum as "a tourniquet."

"We had to stop the bleeding first, then figure out how to heal the patient," Van Horn said.

Well, the initial step worked so well that Van Horn's stopgap bandage is still in place.

"My feeling was that the problem was probably short-term," Van Horn said. "When we could get it solved, we could think about how we really wanted to manage this lake. I thought of the 16-inch minimum as a transitional regulation to help us do that.

"We put the size limit in place because, if you're not getting many new fish every year, it means you can protect what you are getting and let 'em pile up on each other," he explained. "We feared that we were seeing low reproduction, and while we were trying to figure out what to do, (the bass) started doing it on their own.

"A couple of years after we put the 16-inch size limit in place, we didn't have a problem anymore, but I don't think it was because of anything else we did."

By the late 1980s, the little bass had mysteriously returned, along with a lot of bigger

***Phil Cable of Cary** (right) caught this lunker bass on Jordan Lake. Questionable reproduction at some lakes prompted fisheries biologists like Scott Van Horn (left) to recommend 16-inch minimum size limits to encourage fish growth. Customized regulations like this can meet the individual needs of a particular body of water.*

HAWG CALLER BAITS

specimens. Now, as the year 2000 approaches, Jordan is one of the premier lakes in the Southeast for producing trophy bass—like the 14-pound, 6-ounce lunker that Cary's Phil Cable caught (and released) during a tournament in March 1992, or the 11-pound, 4-ounce whopper Durham's Junior McFalls caught the same day. Or the countless 10-pound fish whose photos adorn the walls of tackle shops from Apex to Pittsboro to Sanford.

"It's possible that we had some sampling problems early on, because the fish we missed as one-year-olds one year showed up as two-year-olds the next year," Van Horn said. "It's also possible that in the early period of the lake, when it was slam full of little bass, those bass were eating everything in sight, and that may have been the problem for a couple of years. For some reason, we had poor survival from our young-of-the-year. Maybe we didn't gauge it as accurately as possible, but we did react conservatively."

Van Horn takes no credit for Jordan's turnaround. He says that his 16-inch size minimum didn't have anything to do with the lake's recovery and has affected it only slightly in the past six or seven years.

Van Horn had every intention of recommending that Jordan return to the general statewide limit of five bass, with a 14-inch size minimum and a two-fish daily exemption. But by the time Jordan recovered, fishermen realized—or at least thought—that they had a winner in the 16-inch size minimum. They let it be known that they supported it, that they felt it was at least partly the reason that Jordan was producing relatively short, fat, football-shaped lunkers, like the 19-inch bass that Winston-Salem's Don Rabon caught in February 1993. It weighed 9 pounds, 2 ounces and baffled his taxidermist, who had trouble finding a form that was fatter than it was long.

"Initially, my feeling was that if we were going to have some trophy lakes, we needed to manage for general harvest on other lakes," Van Horn said. "We decided to manage Falls of Neuse as more of a trophy fishery and Jordan for general harvest. But we had the 16-inch limit in place, and a lot of guys liked it, even though it was probably as much of a social thing as anything else.

"It doesn't matter whether Jordan's bass are managed with a 16 or a 14-and-2. Almost nobody's keeping (bass) anyway; you just have a fishery that looks slightly different."

Still, the success of the 16-inch size minimum at Jordan illustrates the point that the biologists who manage North Carolina's freshwater fisheries can tailor regulations to meet special needs of certain bodies of water—or even help match anglers' expectations on others. Currently in place on different Tar Heel State reservoirs are slot limits that prohibit the harvest of bass between 12 and 16 inches, 18-inch size minimums, even seasonal harvest closures.

And that's just for largemouth bass. Striped bass and hybrid (Bodie) bass are managed by different regulations on different lakes, and the Commission has in the past three years also started managing crappie by using specially tailored creels and size limits.

The Commission manages several lakes, most notably Falls of Neuse and Tuckertown, with slot limits that protect from harvest all bass in the 12- to 16-inch "slot."

"Originally, we had three lakes that we wanted to manage with a slot limit: Falls, Tillery and Sutton," Van Horn said. "When we took the proposal to public hearings, a bunch of guys who fished Tillery complained, so the Commission decided to put the slot on Tuckertown instead of Tillery. Just about any of the lakes on the Yadkin (River) system would have been suitable candidates.

"We had talked about putting a slot on Lake Norman, but decided against it because of the sheer size of the lake and number of fishermen who use it. So Tuckertown was perfect; we could improve the fishery for the handful of fishermen who like that lake, and the ones that didn't could go to Badin, Tillery or High Rock."

The results were swift and astounding. When the slot was instituted on Falls of Neuse in 1987, a huge year class of bass spawned in 1984 hit the slot just in time to be protected for another two years. When they grew out past 16 inches, they did so in a huge block that comprised a full 25 percent of the entire fishery. Even nine years later, one third of the lake's largemouths are at least 16 inches long. There's a big group beyond the 20-inch mark, and the lake record has been pushed out past 13 pounds.

"The difference in a slot limit and a big size minimum boils down to this," Van Horn said. "When you have questionable reproduction on a lake, a straight size minimum is usually good. The tendency, in a lake where reproduction is good, is that fish will stop growing if you protect them, and you don't want to manage for a trophy fishery by stockpiling smaller fish.

"The slot limit allows for some harvest of fish at a smaller size, but I'm not sure you could tell the difference between a lake with a slot limit and one with our general statewide 14-and-2 regulation," he said. "What's wrong with allowing harvest, on a limited basis, to people who want to use those smaller fish? Nothing! And if you can kill some 10-inch bass, you can have a positive impact on the number of bass you get that are 16 inches and bigger."

A big minimum size limit for bass—North Carolina manages three reservoirs with an 18-inch size minimum—is designed to protect fish at smaller sizes on lakes where reproduction is questionable or spotty.

The Commission experimented with 18-inch size minimums on four different lakes in the late 1970s—Tillery, Thom-a-Lex in Davidson County, Higgins in Greensboro and Cane Creek in Union County near Monroe. The question Van Horn and other biologists wanted answered was "Can fishermen take out enough fish to affect a fishery?" The 18-inch size minimum would be restrictive enough to show, one way or the other, whether angling pressure could affect a fishery.

"We found out that fishermen can't fish a lake out, but they can shape the size and age structure in a lake by harvest," Van Horn said. "An 18-inch size minimum will realistically eliminate any legal harvest during the first four years of a bass's life. If you put it in place and all the fish get older and bigger, you know fishermen can have an effect. If you put it in place and nothing happens, then there's no point in using regulations to manage that fishery."

Fishermen loved the 18-inch size mini-

***Continuous research** by Wildlife Commission fisheries biologists like Joe Mickey has resulted in improved fishing. On several North Carolina lakes, rules that protect fish in the 12-inch to 16-inch "slot" have helped to create a lot of trophy bass in just a few years.*

DAN KIBLER

KEN TAYLOR

***North Carolina's** bass lakes enjoy good fishing today because of careful regulations that have produced good crops of catchable fish.*

mum on Cane Creek and Thom-a-Lex, and it remains in place today. Reproduction was so good at Higgins that biologists found smaller bass stockpiling, so the 18-inch size minimum was removed and replaced with a statewide 14-and-2. At Tillery, the Commission removed the 18-inch size limit and replaced it with a 14-and-2 when fishermen argued against the proposed slot limit.

Lake Sutton, a man-made lake used as an overflow from CP&L's power plant on the Cape Fear River near Wilmington, got an 18-inch size minimum and a seasonal harvest closure in 1995. Originally, Sutton had a 12- to 16-inch slot limit, but it wasn't working.

"Growth rates at Sutton were just astounding," Van Horn said. "You had fish in the slot as three-year-olds, and as four-year-olds they were gone. Maybe it was the Florida-strain genes, maybe the warmer weather, maybe the longer growing season.

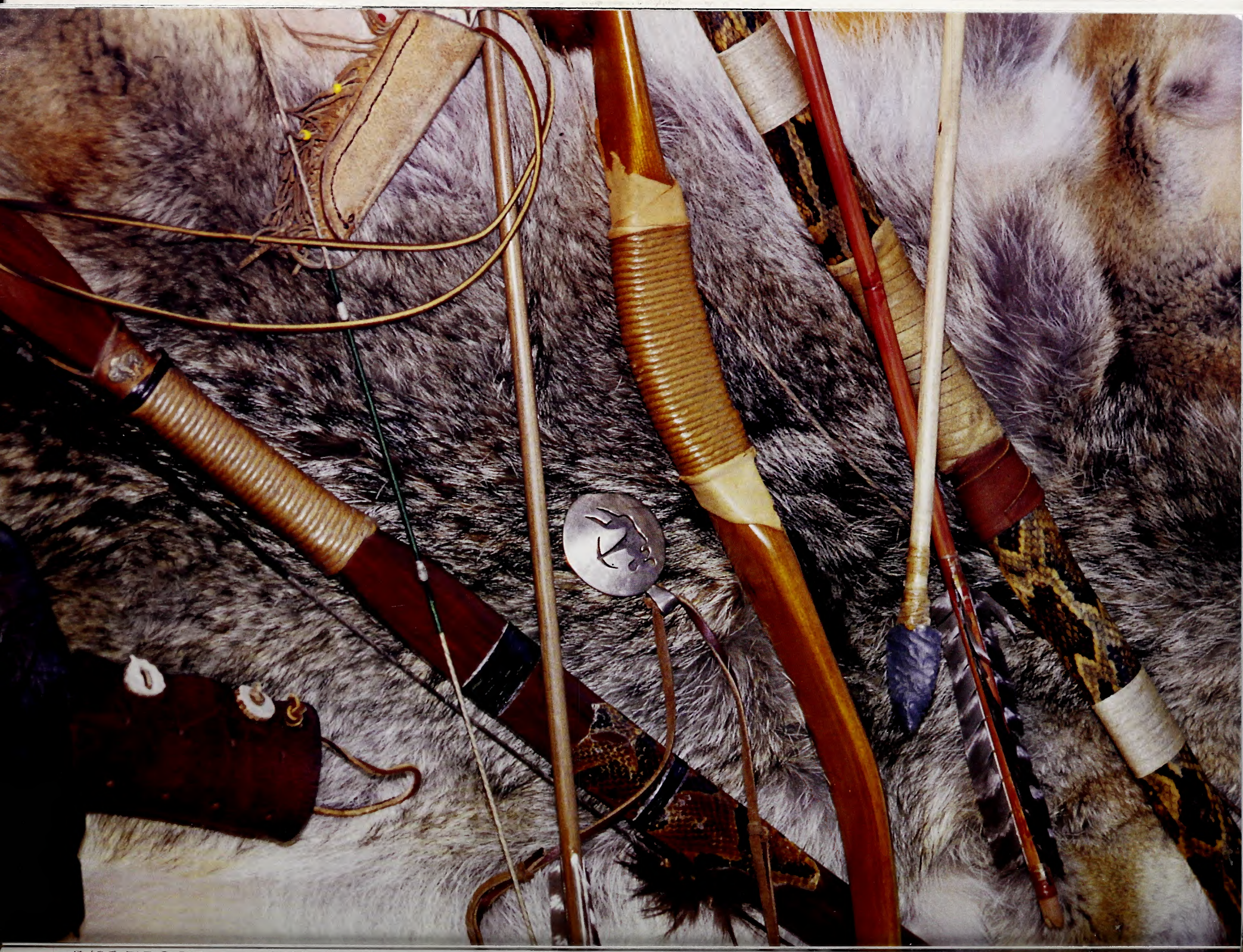
"But Sutton has very erratic reproduction. Sometimes it's got weeds and sometimes it doesn't. The water level is very unstable; sometimes they pull water out during the spring, and sometimes they put more back in. It's not a natural lake, and we misjudged that when we put the slot on, so we didn't want to be killing a lot of smaller fish.

"Let's say that at Sutton, your five-year-old fish are all over 16 inches, your four-year-old fish are already out of the slot, but your two-year-old fish can still be less than 12 inches long," Van Horn said. "If one year class fails, you might be left without any fish from 12 to 16 inches, and if fishermen are harvesting everything above the slot, you're creating a big hole in the fishery.

"So I suggested we go to an 18-inch size minimum, so we can protect those fish an extra year after they leave the slot. And that way, we'll always have one year class protected, assuming we don't have successive years of spawning failure."

Overharvest during the winter influenced the Commission in 1995 to put in place a catch-and-release-only regulation at Sutton from Dec. 1 to March 31 annually. Bass were apparently congregating during the winter in only a few spots in the 1,100-acre reservoir, making themselves easy pickings for anglers, who could change the fishery despite being able to legally keep only five bass per day.

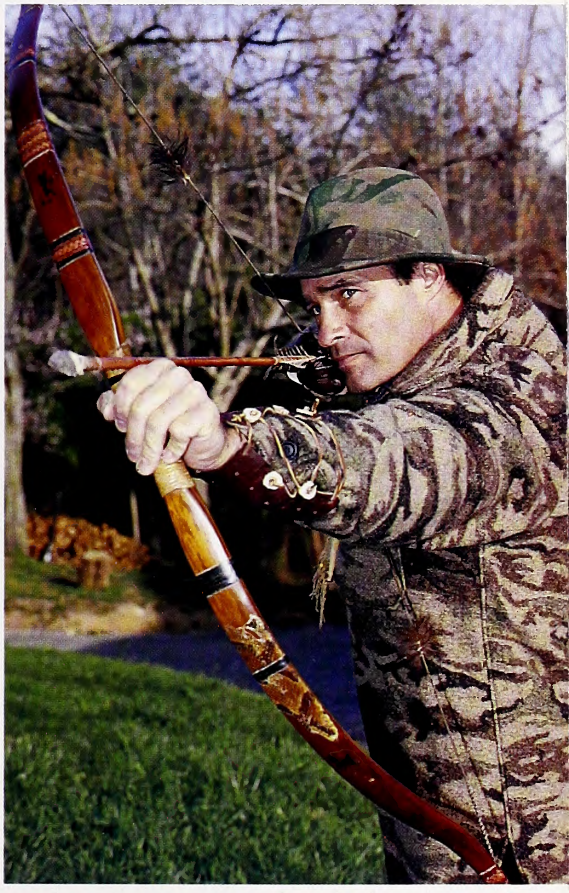
The result of protecting water quality and applying thoughtful regulations where needed is good fishing. And there's plenty of that on North Carolina's bass lakes. ☒



A Flight of Spirit

The soul of traditional archery is its artistry, and it can be at once plain or profound.

written and photographed by Mike Gaddis ©1997



Traditional hand-carved *bows come in all shapes and sizes, but they share one thing in common—a connection to our self-sufficient past. Pictured from top to bottom: an Osage hunting bow, Plains Indian horse bow and an Osage recurve hunter. Master bowcrafter Dane Snodgrass (right) shows the proper way to target a traditional recurve.*

It begins as it has always begun, with the only living thing that carries its warmth, beauty and vigor into death.

Wood. Through its enduring and mystical capacity to bend and recover flows the energy of the people. Across countless generations and cultures it has passed, in arcs and crescents as natural as the path of the moon. Until its form and function have assimilated the very rhythm of survival and expression, until custom has become tradition, until tradition compels another man, 80 centuries removed from the first, to fashion another *bow*, and to enable an arrow to fly.

Then, in a revelation of wandering grain and color, its loveliness is released. Then, in the graceful eclipse of a tensioned limb, the symmetry and freedom of a flighted shaft, the spirit of the man is permitted flight also.

It is small wonder that traditional archery is in renaissance.

The lure of a stick bow, an arrow and a string is powerful for the many who harbor a primitive and natural yearning that will never be satiated by the data bytes in cyberworld. Their desire for simplicity, individual expression and self-sufficiency is too great. It kicks back to childhood, to a blood pact with an Ogalala Sioux, to the romanticism of Sherwood green against Nottingham, and it has never grown out of the man or the woman. For these, the longbow is progress toward the past, the compound a regression to the future.

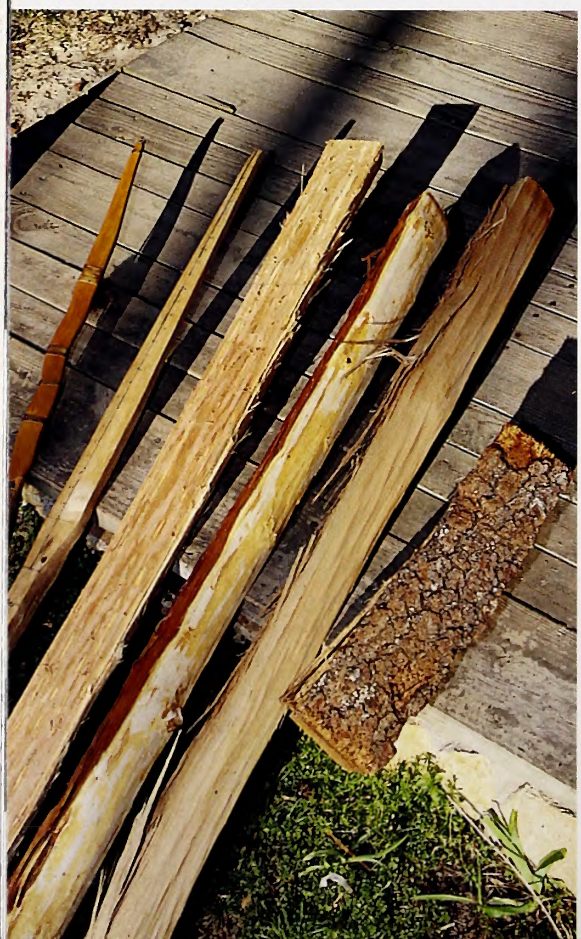
"I parted with wheels (of modern compound abows) in the early 1980s," muses Kenneth Byrd, a devout traditionalist. "Now every bow is a love affair."

To the purist, traditional archery means bows, arrows, points, strings, quivers, arm guards and such constructed wholly of organic materials, such as wood, horn, bone, antler, ivory, stone, rawhide, flax, and sinew, within a design of multicenturied heritage. Enthusiasts, however, acceptably expand that definition to include composite bows and arrows *of traditional design* that incorporate modern materials, either for strength or aesthetics, including fiberglass, epoxy, color dyes, pheonalic, Dacron, Fast Flight and even aluminum (i.e., Easton's Classic shafts). Handcrafted, or largely handcrafted, are the watchwords.

A fitting bow can take the form of a short bow or longbow, adopting the primitive brevity of a Native American horse-bow, or the decorous gesture of an English longbow. It may be completely of one wood, or laminated, such as walnut backed with hickory for added strength and resiliency. Takedown bows, too, are acceptable. Maurice Thompson's timeless tome *The Witchery of Archery*, originally published in 1878 and largely responsible for the elevated popularity of archery nationally at the turn of the century, fixes a proper "gentleman's" bow, or longbow, at 6 feet from tip to tip. Today, a longbow generally measures 62 inches to 72 inches, with 68 inches most common. Most shorter traditional bows are either of recurve or straight-limbed, flatbow design.

Though certain select woods have been prevalently employed in traditional bow making, notably yew, lemonwood, osage orange (*bois d'arc*), ash and hickory, serviceable bows have been crafted from virtually every wood imaginable. North American natives such as black locust, mulberry, walnut, dogwood, white oak, red elm, hornbeam, crepe myrtle, vine maple and willow have all made the list, plus such exotics as coco bolo, kingwood, tulipwood, zebrawood, shedua and bubinga. Likewise, for arrows, Port Orford cedar has been cherished, with ash, larch, yellow birch, Douglas fir, poplar and cherry also esteemed.

Unlike most matters of modern exchange, you can pour your soul into a piece of wood and get as much in return. The essence of



A variety of simple *hand tools, a little knowledge and an eye for detail are needed to make a fine traditional bow that performs faithfully under field conditions. Pictured above are some of the required tools along with a roughed-out bow. A traditional bow takes shape in a series of steps. Billets are cut from rough wood then split into staves and aged. Once dry, a roughed-out bow is carved then refined into a finished bow.*

traditional archery is its artistry, and it can be at once plain or profound.

You start in the woods rather than an archery shop. With a little brow-sweat and native ingenuity, and the simplest of tools, you transform two pieces of wood into an extension of yourself. For some, it stops with a pleasantly shaped stick. For those of unyielding perseverance, it ascends to an art form, in adroitly sculpted works of signature style, until it becomes a compulsion for others to possess the result.

And it's more than art. With a traditional bow and a stone-tipped arrow, it's possible to fell any game bird or animal on the face of the earth, from a grouse to a grizzly. The skills necessary to complete the circle are stealth and instinct, largely innate and free of device.

Master bowyer Dane Snodgrass of Stoneville works by preference with North American woods and solely with natural materials, crafting primitive stick bows that have garnered an elite national following. His bows, painstakingly beautiful and perfectly lethal at ethical hunting yardages, are primitive only in the sense that they follow ancestral Native American patterns.

"I grew up in South Dakota, hunting and fishing," he recollects, "one of those kids who always played cowboys and Indians. I always wanted to be the Indian."

It's hard to imagine Dane, with his passion and fascination for wood, both its personality and dynamics, as other than the traditionalist. "I was in Indiana recently. We hunted in a sea of second-growth osage. I cut 10 or 12 logs. I was more excited over that than the 10-point buck I missed."

Also, he says, "it's more important how you do something than what you do. I'm a 15-yard hunter. The intimacy

of that speaks to me."

Dane favors osage, black locust and mulberry, in that order, and still harbors a fondness for hickory, "especially hickory with flukes and fluting and wind shakes," which make it more difficult to work, but more artistically gratifying.

Snodgrass builds bows from the stump, cutting prospective billets of the chosen material roughly 8 inches in diameter and 6 to 8 feet long. Billets are usually collected in the spring when the cambium layer is active. The rough billets are split into staves of the same length, from which the actual bows will be made, sealed on the end to prevent checking, and set aside to air dry, "the longer the better." Most woods require three to four years as a minimum.

Once dry and ready to work, a stave is stripped of bark, the grain is assessed, and its potential is determined. In the hands of a master bowyer like Snodgrass, even tortured staves like fluted hickory and vine maple will surrender a bow, but only the truest and most perfect will permit an exquisite bow of traditional design and faithful performance. The decision is never hurried, and sometimes years transpire before the onset of work on an eccentric split.

After the approximate design of the feasible bow is sketched onto the stave, the wood removal process begins. A hatchet is employed to rough in the belly (front of the bow), and then the work progresses from coarse to fine, via a series of other hand tools, including drawknife, farrier's rasp, wood rasps, shinto (a scraping device from hacksaw blades), files, cabinet scrapers, spokeshaves and pocket knives. The outline is slowly relieved into shape and dimension.

"When the limbs start to bend," Snodgrass exclaims, " it gets exciting!"

It also initiates the most crucial step of the bow-making regimen, the procedure of tillering, during which wood is meticulously exacted from each limb until the two bend in balance relative to the draw point. Unlike most modern compounds, bows of genuinely traditional design are shot off center; that is, the draw point (or nocking point of the arrow) is 1 inch to 2 inches above the center of the bow. This must be accounted for in the tillering process if the bow is to have ideal cast and durability.

Once tillered, the nearly completed bow is sanded and "boned" (rubbed with a piece of metal or glass to compress and burnish the fibers) to perfection, sinew-wrapped for strength if the design is ultra-critical, embellished with Native American accents, finished, and fitted with a Dacron or linen string. Onto each completed bow Dane signatures a Lakota Sioux aphorism, "*Akita Mani Yo*"—walk and observe everything you see.

An average of 30 to 40 hours go into each Snodgrass bow; presentation pieces easily double that. Highly in demand, they

***The addition of** man-made materials adds stunning beauty and strength to traditional recurves and longbows. Below are some of Ben Graham's master creations.*

Custom arrow-builder *Kenneth Byrd checks a shaft spine to assure draw-weight match. Hand-crafted wooden arrows are the perfect complement to a traditional bow. From hunting shafts to presentation-quality arrows (below), Byrd and other traditional arrow makers refuse to sacrifice quality.*

command prices in the range of $250 to $1,000, and many are sought exclusively for their artistic impression.

Art takes many forms, and traditional archery is painted against a sweeping canvas. Six years ago another North Carolina man grew weary of a life-style that had revolved for years around tensioned, high-production employment and sought something simpler and more complete. He's found it. He builds custom bows in a shop behind his house in an aptly secluded corner of Cabarrus County. Specifically, some of the finest artisan-quality, laminated recurves and longbows in the nation, under the Hummingbird banner.

As a boy, Ben Graham of Mount Pleasant grew up hunting and fishing near Albemarle, discovering vintage Bear and Hoyt recurves as a teenager. Closing the circle comes naturally for this gifted perfectionist.

"I enjoy working with a variety of woods and bow styles. And I just love it when some guy or gal comes in here and says, "I want this kind of wood in my riser, and this in my limbs, and these kinds of tips and this kind of grip. Sometimes it ends up one of a kind—that pleases me."

Custom-laminated bows are a blend of woodwork, mechanics and finesse, and Ben's designs incorporate the latest in reflex/deflex mechanics, while remaining fundamentally true to traditional tenet. Hummingbird bows have been proven at top archery echelons, by hunters and target archers alike. They look good and shoot better—faster, smoother and even quieter than many conventional traditionals.

Graham is superb at composing exotic woods into shooting art, especially the rosewoods: coco bolo from Mexico, kingwood and tulipwood from South America, the Honduran varieties, with their rich color, fascinating grain and stability. After the rosewoods, he likes African woods of good

grain—shedua, bubinga, zebrawood. Overall he stocks about 18 species. But it's more than just picking up a piece of wood and putting it into a bow.

"You look at the grain and figure the exact way to cut it," he explains, "so that it gives you the prettiest pattern when the bow is finished. I'll spend a half hour going through woods before I start. I want a piece of wood running just right for *that* bow."

Ben also uses any man-made material he feels will improve looks or durability, as long as the character of the wood is retained and it leads to a bow of the form and function desired. Fiberglass and epoxy are frequently utilized, along with pheonalic, a pliant and superstrong bolster of paper, linen or canvas core, which lends a pleasing pinstripe effect to the riser.

Nothing short of 20 exacting steps goes into one of Ben's bows, and, board wood to basic, the finished product demands at least the same number of hours. Normal production has two bows in process per week. To assure the specified draw weight, limb laminations are ground to a .001-inch tolerance, and unrelenting attention is applied in bringing a bow to the elegant standard that patents the line.

Bows are offered in four styles: a one-piece and takedown recurve, and like configurations in a longbow. Hummingbird caters to a steady, discriminating national clientele, testimony to the excellence of a reborn man and a backyard industry six years young.

Kenneth Byrd of Flat Branch builds arrows, the kind that move people to whistle softly under their breath and make promises to themselves. Their first question is often "how soon?" rather than "how much?"

He's won numerous state and regional competitions and in 1996 annexed the Professional Bowhunting Society's prestigious national Arrow Builders' Competition, including Best Wood Arrow and People's Choice categories.

Archery first spoke to him in the swamps as a child, where he made primitive bows and spears. "I knew you needed a string and an arrow and that was about it," he recalls. In his teens, like Graham, he shot period recurves. As an adult, he suffered a stint of compound archery, until a friend reintroduced him to traditional gear almost 20 years ago, and the circuit breakers tripped.

"It was spooky, when the hand-eye coordination started to follow my will and the arrow became true to the target... so spooky it hooks you."

Since then he's never wavered, and he started building arrows when he couldn't find the consistency he craved in across-the-counter shafts. "The industry was geared to

***Nothing short of** 20 exacting steps go into one of Ben Graham's bows. Graham (above) matches limbs with a riser on one his laminated recurves in the early stage of assembly.*

a 5-pound draw weight tolerance, so only about four arrows in a dozen truly matched my bow. I thought I could do better than that." He excelled so conspicuously that he soon had people at his door. Now he's besieged with nationwide demand, for both his Byrd-Built line and exclusive, custom orders. If you hear a complaint about Byrd arrows, it's likely that "they're too pretty to shoot."

A dozen nicely turned Byrd hunting arrows costs about $60. They feature tapered shafts, an 8-inch crown of any color, choice of cresting, turkey feathers in any fletch cut, Mercury, Bohning or self-hardwood nocks, and customer's option broadheads. A presentation-quality custom dozen may run $250 or more, and the only limit is the customer's imagination and a few quality convictions Kenneth refuses to sacrifice. In his shop are breathtaking examples footed with Gabon ebony and capped with buffalo horn nocks, trimmed with exotic flight feathers, gold leafing, snakeskin inlays (gorgeous), bone, ivory, and ground jewels, all precision matched and personalized with

the customer's signature. A data card and certification accompanies each delivery, detailing technical specifications and authenticity.

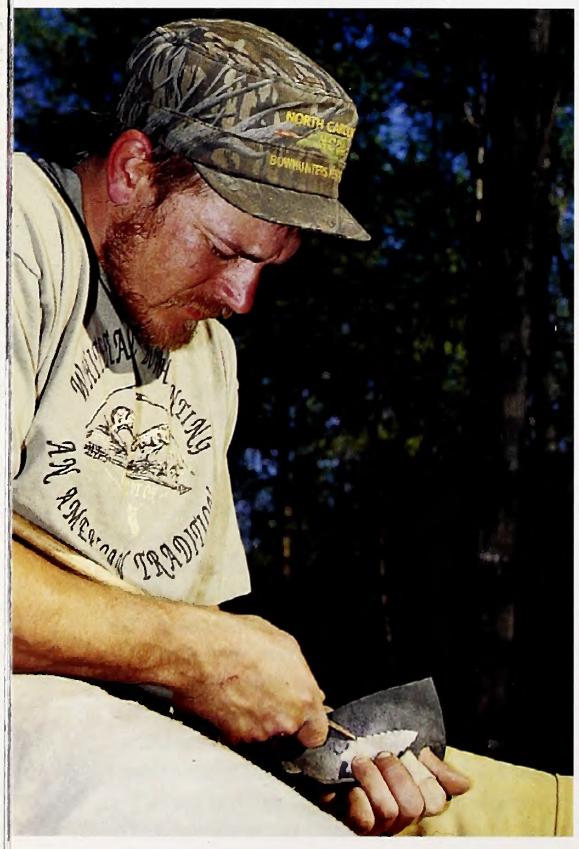
Port Orford cedar, the most time-honored of all arrow woods, is still Byrd's standby, along with compressed ramin, a Borneo exotic, though his first love is Alaskan yellow cedar, rarely available. Western larch he fancies also, for its density and strength, and Sitka spruce for its rapid recovery from bow thrust paradox. Byrd arrows are rapidly becoming venerated classics.

Beyond the arrow flight which brought it to rest there, few things are more intriguing than a perfectly preserved ancestral arrow point, surfacing unexpectedly along a wayward farm path. We marvel at its singularity in stone and wish that we might know the person who tooled it. The thought of a modern man at the threshold of the year 2000 so intrigued that he could develop the skills to duplicate and even surpass the mastery of that centuries-gone Native American is perhaps even more engaging.

He lives near Alexis, his name is James Parker, and he's one of the absolute best in America. He hunts primitively, doesn't own a firearm, skins deer with a stone flake, and flint-knaps arrow points, each as different and exquisite as a snowflake—and to watch him do it is utterly captivating.

"I love wood and stone," he admits, "so much that it's a struggle with everything else."

Basically, flint-knapping involves the alteration of stone into tools using a combination of percussion and compression. The parent stone, or stock, is percussed with another stone to produce a workable flake, which is then further struck or pressured by use of wooden or antler billets, hammer stones and lever sticks into a usable tool, in this case an arrowhead to hunt with. With arrow points, as with most tools, the knapper produces a core design and then notions in attributes to make each distinctive.



***No traditional arrow** would be complete without a traditional stone arrowhead. Flintknapper James Parker (left) puts the razor-sharp finishing touches on a stone arrow point. Point designs (above), as varied and exquisite as snowflakes, were used by Native Americans to efficiently take all forms of game.*

"I love it to death. I've done it in motels, sittin' on a sheet knockin'—pow, pow, pow - people next door hollerin,' 'What the heck's goin' on?'"

Parker employs native stones, primarily rhyolite and quartzite, for replicating authentic arrowheads and especially likes Catawba Indian patterns, "from the people who lived right around here and used the same local materials." He also works frequently with obsidian, which enables edges that are incredibly sharp and emits airborne, lung-abrading microchips, which must be exhausted from the work area. Impeded by my questions, he still finished a small, flawlessly rendered obsidian point, keen as a twice-stropped

razor, in less than 10 minutes!

James hunts with self-made dogwood arrows tipped with sinew-secured stone points and believes the effectiveness of stone heads at close ranges rivals that of modern broadheads.

Four men—masters all—with a boyhood affection for wood, stone and wild things, who have rediscovered their ultimate expression in traditional archery and pursued their craft to its pinnacle. While the result in each instance has been spectacular, each will quickly and ardently tell you that the deeper charm of traditional equipment is that it doesn't necessitate mastery, just enthusiasm. If you're inclined, all readily encourage you to try a first bow from the tree. The rest follows naturally.

"Sure, it's feasible for a first-timer. In fact," says Snodgrass, "you can do it with the same limb you bent as a kid. I've got a crepe myrtle limb out back I'm going to build a bow out of. Hickory and osage are good choices. It's a question of understanding what you want to do and seeking a little guidance.

"There's all this info that has been passed down so readily available. The three *Traditional Bowyer's Bibles*, by Jim Hamm, offer all kinds of advice. Paul Comstock has a great book called *The Bent Stick* that takes it from the beginning."

Building your own brings immense gratification. Raw materials for purchase, if you're short locally—or just want to start with a sure stave and true shafts—have never been more generally obtainable. When you stand over your first big game animal taken with a self-bow, it has to be incomparable. Nevertheless, if you're uncomfortable with attempting it or purely lust for artisan gear, there's a vast array of choice traditional equipment and accessories available through a host of custom makers and longtime manufacturers like Bear, Martin and PSE that will tickle not only your fancy but also your fingers.

For if the beauty of traditional archery is in the making, the joy is in the shooting.

A smooth and efficient traditional shooting style evokes an almost involuntary, fluid symmetry in the draw and release, a kinetic amalgam of instinct and reflex, that is fairly poetic to watch in someone well practiced. When you find the groove, become one with the bow, feel it give itself to you, sense the momentary, vibrating pulse of the expectant arrow at your fingertips, and watch the truth of faithful flight, it is indeed bewitching.

I couldn't resist. I have my own bow in progress, the first I've ventured since I was nine and blood brother to Cochise. You see, there was this piece of dogwood I had cut about three years ago and thrown under the barn for some reason, and somehow I remembered it. Now I can't put it down. ⊠

Selected Traditional Archery Sources

North Carolina

Bowyers

- Dane Snodgrass, Stoneville: custom stick bows—traditionals, primitives; (910) 573-9353
- Ben Graham, Mount Pleasant, Hummingbird Bows: custom laminates—recurves & longbows, one-piece and takedown; (704) 436-2509

Arrows

- Kenneth Byrd, Flat Branch (Lillington): "Byrd-Built" line and custom orders; (910) 893-9852

Stone Arrow Points

- James Parker, Alexis: also custom stone knives, spearheads; (704) 263-0745

Leather Crafts

- Gathie West, Bladenboro; (910) 863-4686

Associations (information, sources, shoots)

- Little River Stickbows; contact Kenneth Byrd
- Carolina Traditional Archers; contact Bill Stroupe, (704) 263-4564
- Piedmont Traditional Archery Club; contact Don Ward, (919) 563-2682
- Tarheel Traditional Archers; contact Ben Graham

National

Mail Order Catalog/Retailer/Merchandise

- Cabela's Archery, Sidney, NE: compendium source for Bear, Martin, PSE recurves and longbows, finished arrows, accessories; (800) 237-4444

Periodicals

- *Traditional Bowhunter*, bimonthly, $16/yr. or at any comprehensive newsstand: covers the field of traditional archery, with how-to articles, videos, custom bowyer and arrow-builder listings, full of national sources for self-bow and arrow supplies, all types of do-it-yourself supplies for traditional archery crafts; P.O. Box 15583, Boise, Idaho 83715; (208) 362-0325
- *Primitive Archer*, quarterly; $16/yr. or at any comprehensive newsstand: same scope of coverage as *Traditional Bowhunter*, except slant is geared entirely to primitive segment; P.O. Box 209, Lufkin, Texas 75902-0209; (409) 632-8746

Books

- *The Witchery of Archery*, classic title by Maurice Thompson: Zen, "archery adventure by field and flood; practical directions for manufacture and use of archery implements;" first published 1878, reprinted by Martin Archery, Inc., 1984
- *Traditional Bowyer's Bible*, Volumes I, II and III, by Jim Hamm: manufacture of traditional primitive equipment, hunting
- *The Bent Stick*, by Paul Comstock: how to make deadly primitive bows from common trees; $11 from author, P.O. Box 1102, Delaware, Ohio 43015

Traditional Archery Booksellers (titles above and more)

- Bois d'Arc Press, P.O. Box 233, Azle, Texas 76098; (817) 237-0829
- Sylvan Publications, 210 Green Acres, Butte, Mont. 59701; (406) 494-6649
- Great Outdoors, P.O. Box 770, East Lansing, Mich. 48825; (800) 799-7288

Dove Potion Number Nine

Who knows for sure what a mourning dove thinks when it sees a wooden facsimile of itself?

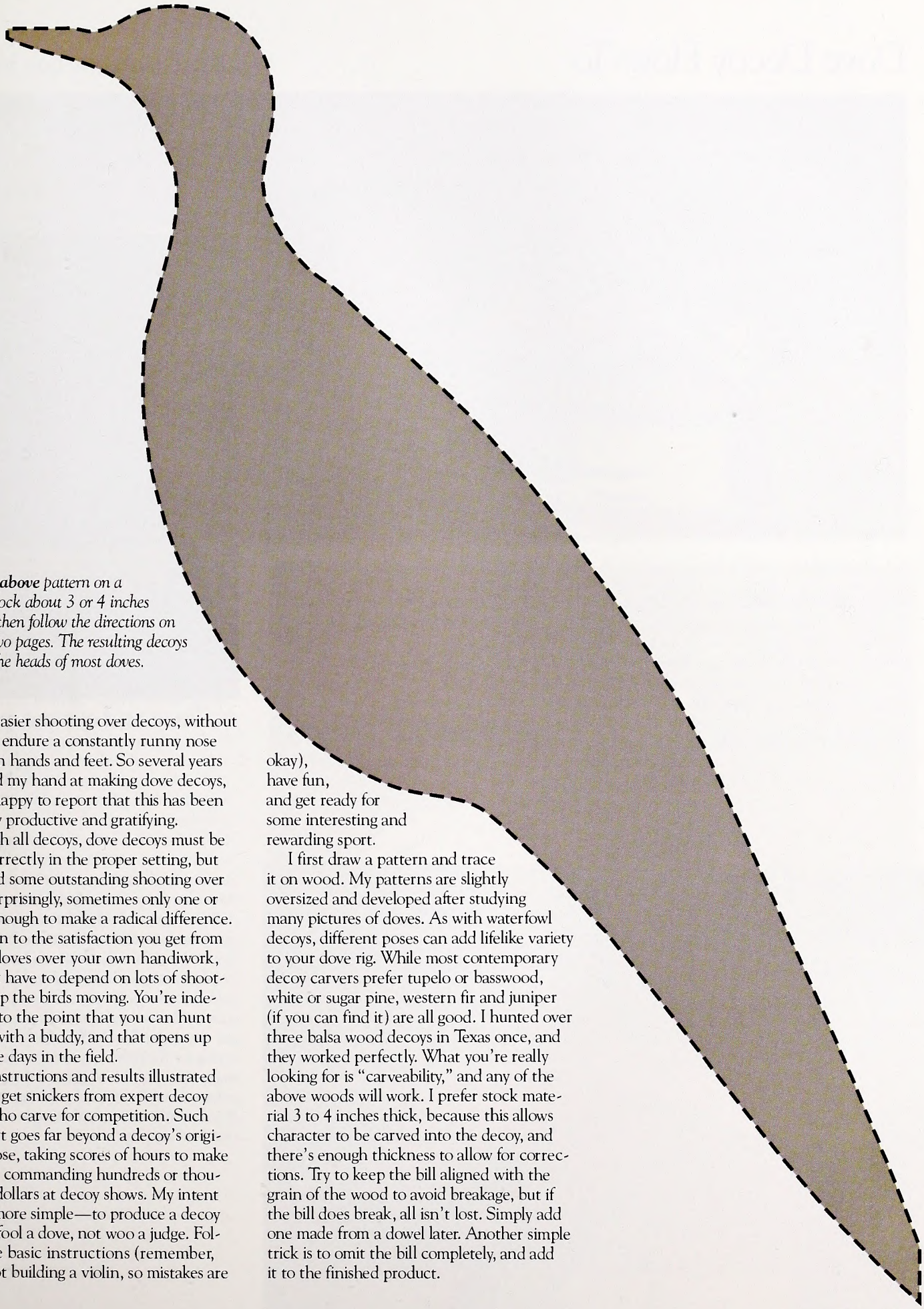
written and photographed by John Crew ©1997

***Hanging as few as** one or two dove decoys can make a big difference in hunting success. These decoys were carved from wooden blanks and then painted realistically.*

The notion that hunters can make and use a contraption to lure game within their range is strongly appealing, and it has its roots in our distant past. We call such objects decoys, and they are unlike any other art form. In their original state they were strictly utilitarian. Decoys were developed to their highest functional form in the last century and the early part of this century during the world's greatest waterfowl hunt, when countless birds were attracted to an enticing wooden counterpart. Many of the craftsmen who created early decoys had skills and talents still appreciated today, and their handiwork is eagerly sought as folk art and a reminder of a bygone era.

This uniquely North American method of hunting has always held a special fascination for me, and that's why I've been hunting ducks over my own handmade decoys for almost 30 years. The satisfaction one gets in making and using one's decoys is special—like loading your own ammunition or training a young puppy to fetch. It adds a personal dimension to hunting impossible to obtain any other way. It strengthens the ancient bond between hunter and hunted.

Over time, however, the cold, wet predawn allure of decoying waterfowl has waned for me. My creature-comfort needs



***Trace the above** pattern on a wooden block about 3 or 4 inches thick and then follow the directions on the next two pages. The resulting decoys will turn the heads of most doves.*

demand easier shooting over decoys, without having to endure a constantly runny nose and frozen hands and feet. So several years ago I tried my hand at making dove decoys, and I'm happy to report that this has been extremely productive and gratifying.

As with all decoys, dove decoys must be placed correctly in the proper setting, but I have had some outstanding shooting over them. Surprisingly, sometimes only one or two are enough to make a radical difference. In addition to the satisfaction you get from bagging doves over your own handiwork, you don't have to depend on lots of shooters to keep the birds moving. You're independent to the point that you can hunt alone or with a buddy, and that opens up a lot more days in the field.

The instructions and results illustrated here may get snickers from expert decoy carvers who carve for competition. Such precise art goes far beyond a decoy's original purpose, taking scores of hours to make and often commanding hundreds or thousands of dollars at decoy shows. My intent is much more simple—to produce a decoy that will fool a dove, not woo a judge. Follow these basic instructions (remember, you're not building a violin, so mistakes are okay), have fun, and get ready for some interesting and rewarding sport.

I first draw a pattern and trace it on wood. My patterns are slightly oversized and developed after studying many pictures of doves. As with waterfowl decoys, different poses can add lifelike variety to your dove rig. While most contemporary decoy carvers prefer tupelo or basswood, white or sugar pine, western fir and juniper (if you can find it) are all good. I hunted over three balsa wood decoys in Texas once, and they worked perfectly. What you're really looking for is "carveability," and any of the above woods will work. I prefer stock material 3 to 4 inches thick, because this allows character to be carved into the decoy, and there's enough thickness to allow for corrections. Try to keep the bill aligned with the grain of the wood to avoid breakage, but if the bill does break, all isn't lost. Simply add one made from a dowel later. Another simple trick is to omit the bill completely, and add it to the finished product.

Dove Decoy How-To

◀ Assemble tools.

1. Cut out patterns with a band saw, the only power tool you really need. Most decoy carvers today use a great variety of power tools, but excellent results can be attained with a few simple hand tools. A half-round rasp, round rasp, knife and drill are all you really need. All decoys shown here were made with the tools displayed. You can attach glass eyes with putty for more realism; taxidermists are a good source for them. Remember, though, your objective is to fool doves, so detail is less important than creating an illusion of a dove. In pattern development and carving, I try to stress the apparent features of a relaxed bird: a tucked head and profile of a resting bird, for example. Be patient in carving, as it may take a while to get the knack. Heads and bills are the hardest for me, so I go slowly here. After roughing out a pattern with a band saw, I can generally be ready to paint each decoy in a little over an hour. If I make several at the same time, they come quicker and improve in quality, too. Constantly check for symmetry to ensure that the final product looks "right."

▲ Trace and cut out pattern.

▼ Carve and sand.

2. After final sanding, you're ready to paint. Artist acrylic paints help duplicate the bird's dull plumage, and only a few colors are needed: black, white, umber and sienna. Paint runs from $2 to $3 a tube. It goes a long way, and brushes are also inexpensive. Use a bird guidebook for color patterns, and remember that it takes several applications of paint to get the desired look. You can't start out trying for the finished product—layers are important. I try to exaggerate the prevalent color scheme by stylized painting. It works. If you aren't satisfied, it's simple to start over and repaint.

▼ Paint and add final details.

3. An eye screw in the back for overhead use and a hole for a dowel leg aid in decoy placement. However, I've found that, without question, overhead decoys are more effective, because they're more visible and get more attention. Choose an exposed tree on the edge of a field that doves are using or, better yet, a conspicuous one out in the field. As with waterfowl, you must watch flight patterns and behavior before you decide where your decoys will be most effective. One important rule is that you can't decoy birds where they don't want to go, so determine their flight patterns before you decide where to put the decoys.

Grab your hunting gear! ▶

4. To place decoys overhead I use a small fishing weight tied to 10-pound mono fishing line. Throw the weight over a limb and let line spool off. Remove weight, tie on decoy and hoist away. Tie off the decoy on vegetation stubble or a stick pushed into the ground and you're ready. The mono line becomes almost invisible, but even so, the birds don't seem to mind any light reflection that may occur. The decoy will actually be snuggled up slightly under the limb, but from a distance the appearance is real—by the time doves discover the fraud, it's much too late! When you're ready to leave, simply untie the line and let gravity do the rest. But try to slow the descent to avoid breaking the bill or marring paint. ⊠

Floating & Fishing

Fishing while drifting down a river is wonderful sport. Here are 12 tips that will make sure your trip is perfect.

written and photographed by Gerald Almy ©1997

Dawn comes softly where the river sweeps hard against the base of the green mountain. By the time shafts of golden sunlight edge into camp, coffee is brewing, eggs are frying, toast is browning in the skillet and the sweet smell of bacon wafts on the thermals pushing up the timbered ridge.

The meal is a simple one, dished up unceremoniously on an old scarred plate, eaten with a tarnished fork as you hunker against a sun-bleached log and watch a bass grab a bug in the pool below camp. But somehow food tastes better here.

Such enhanced pleasure is common when you're float fishing. All the senses seem keener on a river, as if splashed awake with the cool, flowing water. Your ability to perceive is renewed, and the slowed pace of the river allows you to soak in the sights, sounds, smells and textures around you. It's a tonic for sensibilities numbed by weeks of pent-up city life, and it offers some of the greatest riches angling has to offer. With a mere stroke of the paddle you're immersed in a world of rippling currents and silk-smooth pools. Everyday cares are distant memories once you turn the first bend in the river on a float trip.

Whether you're on a swift mountain river or a slow-moving coastal stream, float fishing is an ideal way to escape the rat race of modern life.

Adventure often awaits the float fisherman, too. There's a constant sense of anticipation and mystery about what the next turn in the river will bring. Wildlife will often be spotted along shore—deer, mink, waterfowl, turkeys and squirrels are common sights. Occasionally fast, tricky rapids must be negotiated, and always there is the challenge of plotting one's course on the topo map. As far as the quality of fishing goes, drifting into remote stretches of water far from access points always seems to yield heavier catches than trips made near roads.

But while float fishing can be an enriching experience, the most rewarding trips require careful planning and execution. Otherwise, float fishing can easily turn into a disaster. If you take the carefree attitude that nothing can go wrong, you're asking for trouble. But if you are aware in advance of potential pitfalls and know the best procedures for avoiding them, this sport can provide some of the best fishing experiences of your life.

Learn the fundamentals of float fishing, choose the right rivers and the best stretches, use the proper equipment and follow a few simple precautions. Float fishing can put you into every kind of game fish from bluegills to muskie and can be used on both broad rivers and smaller flowages that etch a veinlike pattern across North Carolina. Some of the species I've caught include largemouth, spotted and smallmouth bass, stripers, walleye, muskies, catfish, crappies, pickerel, bluegill, redear, redbreast, rock bass, white bass, yellow perch, white perch, American and hickory shad, and brook trout, rainbows and browns.

Here are 12 of the most important things I've learned in 25 years of float fishing.

Choose Good Fishing Water. Thousands of miles of rivers and streams await float fishermen in every part of North Carolina. Some are excellent for fishing, while others are just mediocre. Even a specific river may be particularly good in one stretch, just fair in another.

To make the most of your fishing time, do advance research to learn the best streams and rivers near your home and the top stretches for float fishing on them. Inquire with game wardens, sporting goods stores, local outdoor writers and river canoe outfitters.

Once you have a few rivers and sections in mind, try an experimental float. But don't get stuck in a rut, even if you find a productive piece of water. Part of the pleasure of

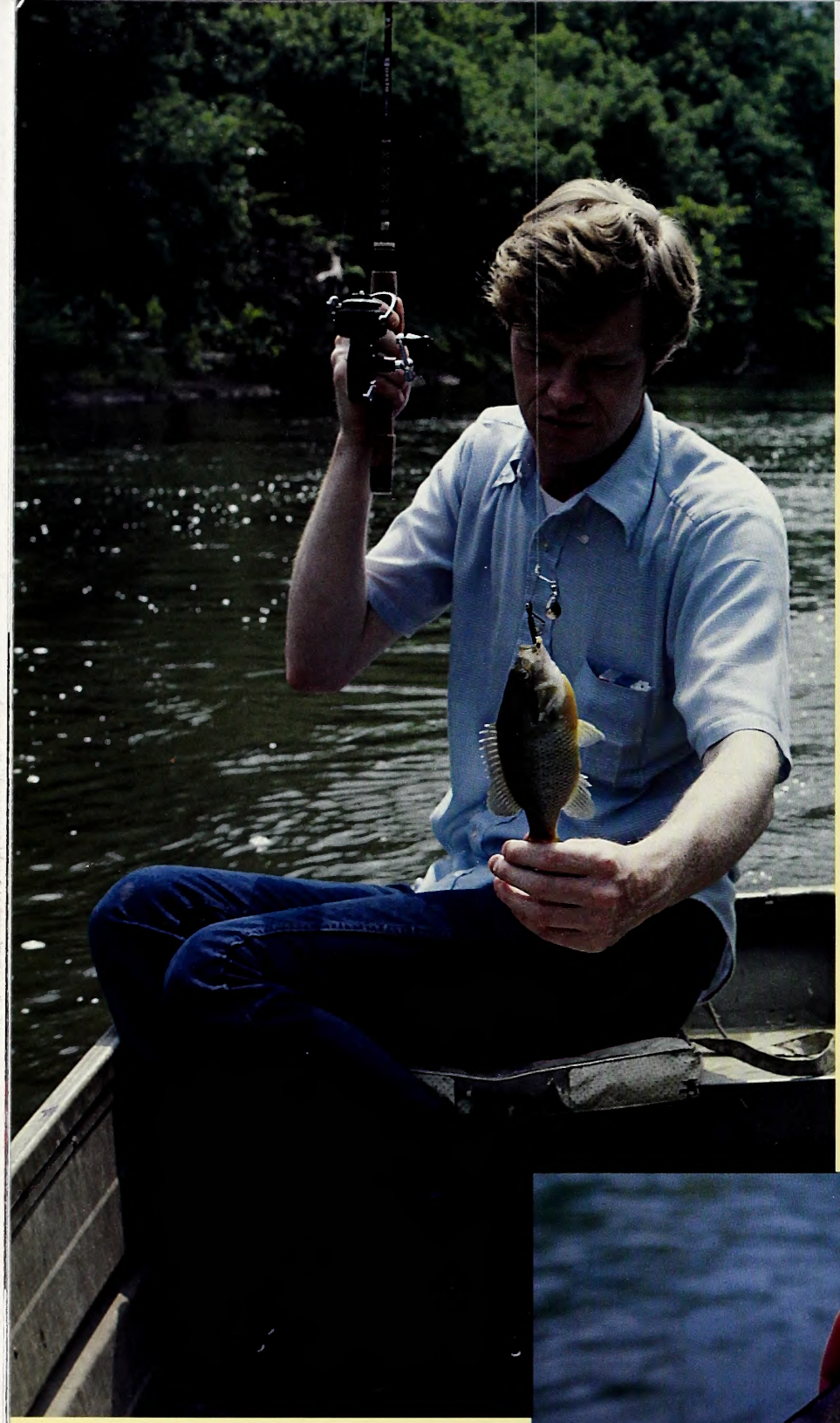
this fishing is exploring new stretches and discovering good spots on your own. In general it pays to avoid areas directly above dams, because cover is often sparse and you will likely have to paddle a lot, then portage around the dam. Also avoid sections with long stretches of shallow water. The best fishing often occurs in rivers where riffles and minor rapids break the flow between deep pools, providing food, oxygen and holding water for the fish. But slower coastal streams such as the Trent, Scuppernong, Northeast Cape Fear, Lumber and Alligator can also provide excellent fishing.

Avoid Dangerous Stretches. This is a sure way to ruin a float trip. Even if you don't capsize trying to run difficult rapids, you may worry about the possibility so much that it puts a damper on the whole trip. Plenty of good fishing can be found on safe stretches where there are only riffles and modest rapids to negotiate.

If possible, always talk to someone who knows the stretch you plan to float before embarking. Find out about any whitewater stretches and where portaging is required. When in doubt, err on the side of caution and walk the boat around difficult water.

Low-head dams are another danger. These may not always be marked on topo maps, and they can sneak up on you if you don't pay attention. Each year they claim lives when people are washed over them and killed or sucked under and held in the hydraulic backwash below. Avoid these stretches or be aware of their location and portage around them.

Avoid Biting Off Too Much River. This is a mistake I've learned from personal experience—more than once. Time and again I've picked too long a stretch of river for the allotted time and wound up paddling furi-



Float fishing can put *you within casting distance of nearly every freshwater gamefish found in Tar Heel waters. Redbreast sunfish (right) are common on some float trip streams.*

ously to get to the take-out point before nightfall. Sometimes even that effort didn't succeed, and I've wound up drifting downstream in darkness, trying to steer clear of unseen rocks and blowdowns. Not fun.

Choosing too long a section to float is not only tiring and potentially dangerous, it can also hinder your fishing. You may think covering more water will let you catch more fish, but actually you'll rush through the water, throwing out quick, haphazard casts as you go because you're worried about being late and not getting through the drift in time. Once you realize you are indeed late, things get even worse. There's no fishing then—just frantic paddling.

The distance to choose for your trip will vary with the speed of the river and how productive the fishing water is. Some streams have a good pool only every quarter mile or so, with lots of shallows in between. Others can hold fish throughout their length. Obviously you'll need a longer float on the former than the latter. Speed of the river current is also important. Some rivers whisk you along quickly; others meander slowly, requiring shorter distances.

As a general rule, plan on 1 mile of river per hour of fishing if you want to cover the water thoroughly. If the river is swift and you want to probe it lightly as you drift, 1½ miles can be covered in an hour. But always err on the side of shortness, particularly for your first drift down new water. To effectively gauge how long a stretch to float, buy a topographic map that will accurately show all the loops and turns a river makes—things road maps don't always portray. This type of map will also highlight landmarks and geographic features along the way that will help you chart your course and arrive at the take-out point exactly when you want to.

Pack Emergency Gear. You may never need it, but having emergency gear on all float trips is a smart move. Bring a complete change of clothes packed in a waterproof bag, plus matches or butane lighter, flashlight, extra water and enough food for an unplanned night on the river. A compact space blanket is a good idea, too, as are a first-aid kit and an extra paddle. A boat repair kit with duct tape or some thin pieces of tin and "liquid metal" adhesives that you can use to patch a hole if you ram into a sharp rock make sense, too.

Choose the Right Boat. Actually there is no "right" boat for float fishing, but some are definitely wrong. A thin, dime store plastic raft that will puncture the first time it scrapes a rock is wrong. A bass boat or heavy V-bottom is also inappropriate.

The best bets for float fishing for most people are johnboats and canoes. Canoes should be chosen only if you've had some practice in them. Pick a 16- to 18-foot model. These are excellent for paddling through long, slow stretches of unproductive water and for negotiating through narrow chutes and tricky rapids. They are not the most stable craft, however, and you should know how to handle your weight distribution and movements before using one on a long float.

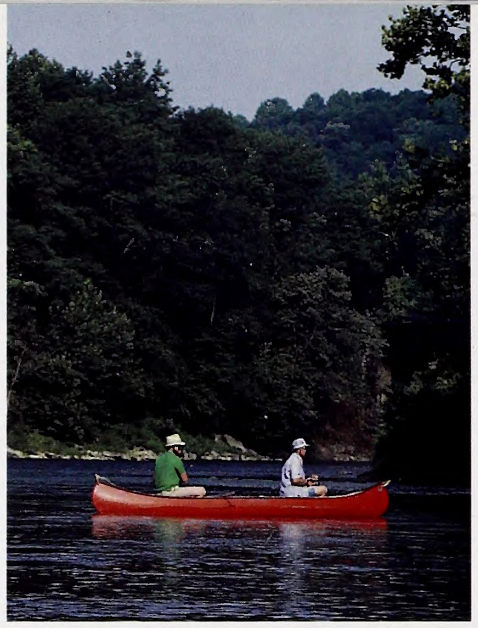
Canoes and johnboats *both make excellent float-fishing crafts. Both offer simple handling and plenty of room for supplies.*

Johnboats are simple, humble boats, but many anglers prefer them because they offer stability and allow you to move around a bit more than in a canoe. You can use either oars or paddles to propel them. They aren't particularly easy to maneuver in riffles and rapids, though.

McKenzie-style drift boats are a third excellent choice for float fishing. They are stable and comfortable to fish from and maneuver extremely well in white water. They are a bit heavy and usually require trailering, however. They're also expensive. Rubber rafts are a final choice. These are fine *if* they are quality boats made with tough material that won't puncture.

Pay Attention to Boat Handling. It's easy to get so absorbed in the fishing that you neglect the oars or paddles. That could mean that you bang into rocks or drift into shoreline branches and get cobwebs all over your face. Or it could lead to more serious accidents.

Always be sure one person is in charge of handling the boat at any time. Sometimes two people may have to contribute when negotiating rapids, but at least one person should always be keeping the boat on a straight course, positioned in the river where the best fishing is and out of the way of protruding rocks. If you see that you can't avoid a rock, tell your partner so they aren't jarred and potentially knocked out of the boat. Better



yet, ask them to pick up their paddle before that happens and make *sure* you avoid it. Besides the danger, hitting rocks scares fish.

Be on the Water for the Prime Fishing Hours. This may not be necessary on some of the best stretches of rivers in North Carolina, where bass, trout, walleye, and panfish might bite all day long. But often in marginal water or on an off day you may find that by the time you drop your take-out vehicle off, unload the boat and gear and shove off, you've missed the early-morning feed. Then when you pull into the take-out point in late afternoon, you'll be leaving the river before the final flurry of feeding at dusk.

There are two solutions to this. One is to get up earlier so you're sure to be pushing off right at dawn, when fishing is best, and time the trip so you finish right at dusk (not easy). The other is to camp. This is the best way I know to be on the river for these prime fishing periods. I took my largest river smallmouth ever—5¾ pounds—by setting up camp, eating dinner, then going out to fish right before dusk. There's no chance I would have been on the river that late if I'd faced a long drive home that evening.

By camping you hit the evening feed and are on the water the next morning for the dawn action, when topwater lures and flies often work well. Make sure camping is legal where you plan to spend the night, however, and be sure to remove every scrap of litter—yours or other people's—when you shove off in the morning. Camping adds a whole new element of adventure and fishing success to a float fishing trip.

Stop Often. Even experienced fishermen

***Flycasting (below) can** add another dimension to an already pleasant floating trip where life moves at the speed of the river and the stroke of a paddle (above).*

***The chain pickerel** is one of the fine gamefish species that can be taken while float fishing an eastern North Carolina blackwater river.*

need to remind themselves to do this. After all, it's called "float" fishing, isn't it?

Casting as the boat drifts downstream is the major way you'll catch fish on a float, it's true. But this should not be your only approach. Often you'll fool some of the best fish of the trip by stopping and probing prime areas more thoroughly. You can either anchor and fish from the boat or pull the craft to shore or on an island and fish while wading.

I've caught and released up to 25 smallmouths from a single pool by stopping and probing it meticulously like this. If you simply cast as you drift through that spot, you will likely land only three or four fish. This is also particularly important when trout are on the angling menu. You may have to wade carefully into casting range and drift a dry fly over a wary brown several times to draw a strike. You can't do that while you're zipping downstream with the current.

Be discriminating and pause where you see the right habitat, or where you know from past experience that fishing will be good.

Bring the Proper Fishing Gear. I've learned this the hard way. Once I packed only two spinning outfits, yet barely a mile into the float we found a bed of huge spawning bluegills in a backwater. I took a couple of fish, but not nearly the number my partner caught on sponge rubber spider flies. Since then, I always pack both spin and fly tackle. You can't run back to the car if you leave something behind.

Fancy or expensive gear is not required. A lightweight spin rod 5½ to 6½ feet long with a reel spooled with 4- to 8-pound line will do for most lure and bait angling. For fly fishing, I like an 8- to 9-foot rod with a size 5, 6 or 7 weight-forward floating line and a leader 7 to 10 feet long that tapers to a 4- to 8-pound tippet.

Bring an assortment of lures such as small crankbaits, spinnerbaits, grubs, plastic worms, spinners, thin-minnow plugs, spoons and soft plastic jerkbaits. For flies, stock a selection of sponge rubber spiders, poppers, streamers and buggy-looking nymphs. If trout are present, bring a selection of terrestrials, plus the common mayflies and caddis for that river. If you want to be *really* prepared, you can add hooks, split shot and a natural bait or two such as minnows, hellgrammites or crayfish. I've rarely found the need for bait on floats, however. Once you get away from the road, the fish are usually quite willing to strike lures or flies.

Avoid Poor Water Conditions. If you live a long distance from the water you plan to float, it can be quite frustrating to pack all your gear, plan the trip and arrive only to find high, muddy water. The way to avoid this is to line up a local source. It can be someone who lives on the river, a tackle shop nearby or a canoe livery.

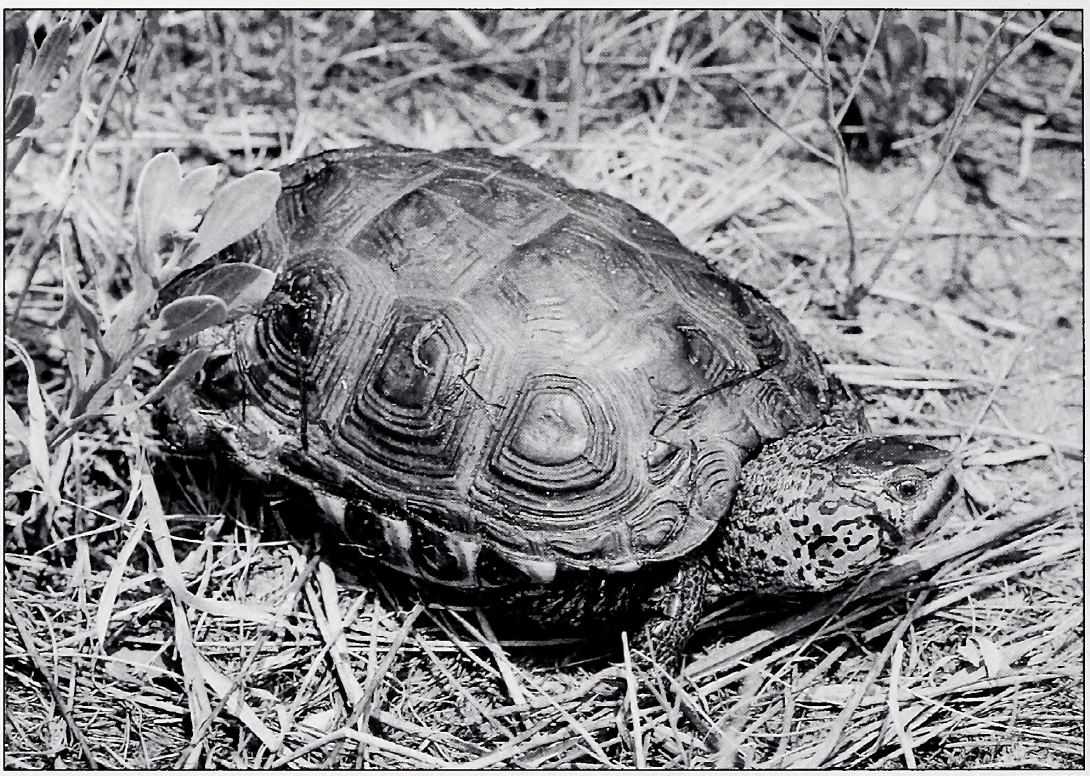
A call to this source to check whether local rains have raised and muddied the water can save lots of wasted time and disappointment. Rarely is fishing good under those circumstances, and you can save a lot of trouble with an advance call.

Search for a Pattern. Float fishing has the tactical advantage of allowing you to cover lots of water. But that advantage is wasted if you don't diligently search for some pattern that influences fishing success. Use a variety of lures and flies in the early stages of the trip, to try to determine which types and retrieves are generating the most action.

Be sure to cast to different types of habitat. The deep midsections of pools may pay off one day. The next day riffles, rapids, eddies, tails of pools or shaded areas near the bank may be the payoff zones. By probing all of these water types with a variety of lures, you can usually key in on one pattern of lure or fly and a specific retrieve, water depth and stream location that are most productive. Each person in the boat should try a different offering in various parts of the river to quickly discover this pattern. Then you can all switch to that most effective combination for the remainder of the trip.

Never Bring Just One of Any Lure. This final tip is worth remembering. If you do happen to bring just one of any lure, that's surely the one fish will start biting with abandon. Then you'll lose it or have to fight your partner over who gets to use it. ⊠

Study Examines Tar Heel Diamondback Terrapins



KEN TAYLOR

***Nearly wiped out** by humans for its meat at the turn of the century, the diamondback terrapin has not fully recovered. Two subspecies live in Tar Heel salt and brackish water marshes.*

Written and Edited by Rodney Foushee

A four-year study of diamondback terrapins being conducted by the Wildlife Commission's Nongame and Endangered Wildlife Section has revealed some interesting insights into the lives of these rare coastal marsh dwellers.

"We have learned a great deal about the movement habits, nesting areas and food preferences of terrapins along the central North Carolina coast," said Phil Spivey, a biologist who has been monitoring diamondback terrapins for the Wildlife Commission in a study area near Core Sound.

Once common in salt and brackish water marshes from the Gulf coast of Texas to Cape Cod, Mass., diamondback terrapins were nearly wiped out in the early 1900s by heavy human exploitation. Though populations have recovered some, large numbers of terrapins in North Carolina can only be found in a few isolated marshes including the Core Sound area.

Spivey and other biologists have marked more than 300 terrapins for recapture at the Carteret County site over the past four summers. Nets are used to catch the reptiles so size, weight and sex information can be recorded before they are released. Over the past two years, some terrapins have also been fitted with small radio transmitters which allow the animals' movements to be tracked. The study will end next month.

Based on results so far, terrapin movement habits vary but none stray too far from where they were hatched. "Some individuals are very attached to some canals and rarely leave while others travel up to 1.5 miles away," Spivey said. Biologists have also identified prime nesting areas for the turtles—small natural sand levees and beaches above the high tide mark in the marshes. "This will help us in the future to know how large an area to set aside and protect for nesting habitat," Spivey said.

Diamondback terrapins are adapted for living in a saltwater environment by having special glands near the eyes that excrete excess salt. The animals, which live up to 40 years, eat mostly small marine invertebrates, especially fiddler crabs, mud snails and small scallops.

Once common throughout North Carolina's coastal waters, the terrapin's popularity as a gourmet food caused its rapid decline at the turn of the century. And the biological fact that female terrapins grow much larger than males only sped up the fall. Turtle soup was so popular in fancy East Coast hotels and restaurants in the early 1900s that the largest female terrapins could fetch $70 or more a dozen.

It was only after World War I, when the taste for terrapin soup had passed, that commercial prices fell and turtle populations began to rebound. But the draining and destruction of the terrapin's salt marsh habitat later in this century made it difficult for many terrapin populations to recover. The diamondback terrapin is listed as species of special concern in North Carolina and is a candidate for federal listing. Biologists believe abandoned crab pots are now the greatest threat to terrapins.

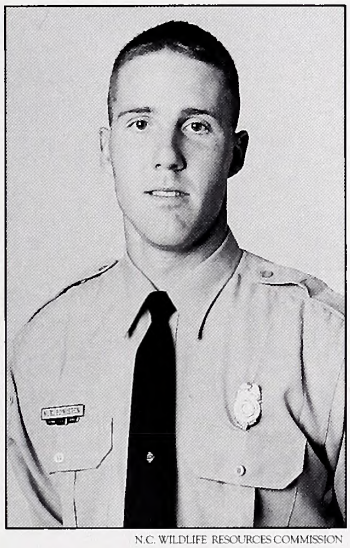
NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

Wildlife Enforcement Officer Honored for Daring River Rescue

A N.C. Wildlife Resources Commission enforcement officer has received a national heroism award for his part in rescuing four people from a swollen river the day after Hurricane Fran swept through the state.

Officer Michael Edmisten received the Higgins and Langley Memorial Award for Outstanding Achievement in Swiftwater Rescue—Special Commendation for his daring rescue of four National Guard soldiers whose vehicle was swept into the flooded Flat River in Durham County on Sept. 6, 1996. Edmisten received the award at the annual conference of the National Association for Search and Rescue, held in Richmond, Va., in late May. He was nominated by the South Orange EMS and Rescue Squad's Technical Rescue Team.

Edmisten was cleaning up debris from his yard the day after the hurricane when he saw several National Guard vehicles trying to cross the swollen Flat River at a bridge on the Old Oxford Highway. A Humvee carrying four soldiers was swept into the raging waters. The vehicle washed downstream until it



N.C. WILDLIFE RESOURCES COMMISSION

struck a tree and began to sink. The soldiers, none of whom could swim or had floatation devices, climbed onto the roof of the vehicle.

Only one corner of the roof was visible above the swift water when Edmisten arrived in a small johnboat equipped with a six-horsepower motor and extra life jackets. "It was not a good place for a johnboat," the officer admits. "But I knew they were in trouble out there and needed some help."

Edmisten rescued two of the soldiers and took them to shore. On his second trip out, the boat capsized when the third soldier jumped from the vehicle to the boat. The officer was briefly trapped between the capsized boat and the Humvee before he and the soldier were washed downstream into a fallen tree.

Edmisten made sure the soldier, who had lost his life preserver in the river, was secure in the tree before he jumped into the current and swam to shore. The officer got another life preserver for the soldier and swam back out to the tree. After placing the preserver on the soldier, Edmisten again jumped into the current to swim to shore, but he was swept through a barbed wire fence and several thickets.

By the time he reached shore the third time, Wildlife Officer Bill Taylor arrived with a larger boat. Edmisten and Taylor used the boat to rescue both the soldier in the tree and a fourth soldier still trapped on top of the Humvee.

Edmisten, a Concord native, became an enforcement officer with the Wildlife Commission in 1996. Durham County is his first assignment.

McCall Nominations

Nominations for individuals, clubs and organizations are being sought by the N.C. Wildlife Resources Commission for consideration for the Dr. William H. McCall Small Game awards.

Awards are given annually to citizens making outstanding achievements in small-game work in North Carolina.

Nominations will be accepted from July 1 through Sept. 20. Winners will be honored at the January 1998 Commission meeting.

For a nomination form, write Small Game Awards Program, Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

The awards are named in honor of Dr. William H. McCall of Asheville, a former member of the Commission who is a lifetime small-game advocate and member of the National Field Trial Hall of Fame.

'Frog Nights' Brings Back Fond Memories

Dear Wildlife,

Your article "Frog Nights" (June 1997 issue) brought me a flood of emotions by reminding me of fond childhood memories and an adult embarrassment.

As a child growing up in Havelock, it was my father's chore during the summer to round up his six children from the great outdoors. It was far from unusual for my father's face to be pressed against the screen saying "Ya'll hear those black snakes?" Of course, being children, that caught our attention.

"They're mighty close! It's time to come in," was all it took to lure us back indoors. As children growing up in a small town in the '60s and '70s, your parent's word was gospel.

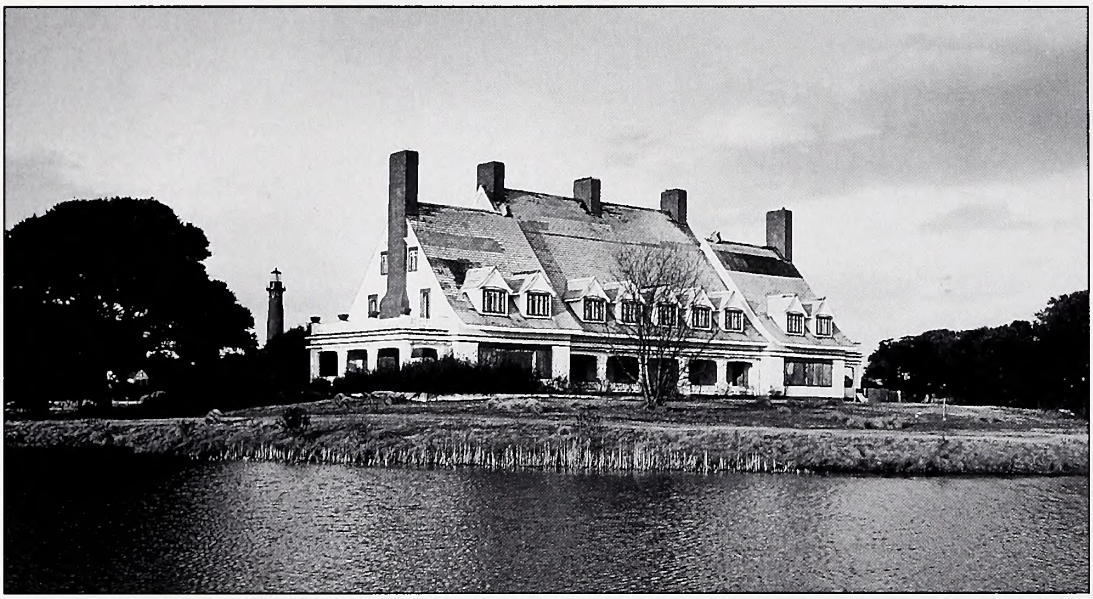
Those snake beliefs went unchallenged until one night, at the age of 29, while traveling with my husband from Greenville to Wilmington. With the sounds of the frogs overwhelming the night, we began a serious debate about the source of the noise. I informed my husband that my father told me they were the sounds of black snakes. In the heated debate, we pulled the car over to the side of the road to "prove our points."

The next morning, I made a phone call to my father to settle the matter only to hear the sounds of chuckles and delight. "That was the only way I knew to get you kids in at night," he said.

My belief in my father's tales has given him unbelievable parental wisdom. I will cherish that snake tale and the memories.

—Connie Sermons West
Wilmington, N.C.

Currituck Wildlife Festival Moves to Whalehead Club



KEN TAYLOR

***The historic Whalehead Club** in Corolla will be the site of this year's Currituck Wildlife Festival. Proceeds from the festival will be used to establish a permanent wildlife museum inside the famous Outer Banks hunting lodge.*

After 15 years of promoting Currituck Sound's rich waterfowling heritage, the Currituck Wildlife Festival will make history itself next month by moving its celebration to the historic Whalehead Club in Corolla.

The 16th annual Currituck Wildlife Festival will be held Sept. 6-7 at the famous Outer Banks hunting lodge overlooking Currituck Sound. In the past, the event had been held at a local high school. But organizers this year decided the Whalehead Club was a more fitting place for the celebration.

"This is where we are going to have our museum and we think it is a more appropriate location for the festival," said Nancy Bray, chairperson of the Currituck Wildlife Guild, which sponsors the event.

The Whalehead Club, listed on the National Register of Historic Places, has a storied past. Edward Collings Knight, a wealthy northerner, decided to build the club in the early 1920s after his wife was refused membership into other Currituck duck clubs. Completed in 1925, the 25,000-square foot mansion —complete with Tiffany light fixtures and cork floors—was the most opulent of all the Currituck hunt clubs. Whalehead remained an active hunt club for decades but eventually was sold to developers. In 1992, Currituck County purchased the club and a non-profit trust was established to restore the building to its former glory. Once restored, the Whalehead Club will be the home of the Currituck Wildlife Museum, which will showcase the wildlife heritage of Currituck Sound, northeastern North Carolina and Virginia's Back Bay.

Events for the upcoming festival will include waterfowl calling contests, decoy competitions, woodcarving and painting demonstrations, retriever demonstrations and an auction. Wildlife art and various antique decoys, boats and guns will also be displayed. All proceeds from the event benefit the Currituck Wildlife Museum and its future home in the Whalehead Club. For more information, call Nancy Bray at (919) 232-3297.

New N.C. Wildlife Resources Commissioners Sworn In

BODIE McDOWELL

***Superior Court Judge** J. Richard Parker (left) of Manteo congratulates the two newest members of the N.C. Wildlife Resources Commission after they were sworn in at the Commission's May meeting. Commissioners Polie Cloninger (center) of Dallas and Jim Bennett (right) of Greensboro replace John W. Parks III and Ovide E. de St. Aubin, whose terms expired.*

First College N.C. WILD Education Site Dedicated

MELISSA McGAW

***Dr. Harold Mitchell (left), president of** Roanoke-Chowan Community College, and Wildlife Commission education specialist Mike Overton dedicate the school's N.C. WILD education site in May. This site, one of seven completed in the state, is the first one located on a college campus. A dozen more N.C. WILD sites, which are developed by the Wildlife Commission for environmental education, are planned across North Carolina.*

Genetic Probe May Help Detect Tiny Fish Killer

North Carolina Sea Grant researcher Parke Rublee and colleague JoAnn Burkholder are working to develop genetic probes that are able to detect the toxic dinoflagellate, *Pfiesteria piscicida*—a deadly and elusive organism blamed for fish kills along the Tar Heel coast. Rublee, a University of North Carolina at Greensboro biology professor, and his students have developed probes that are able to detect laboratory cultures of *Pfiesteria*. They are currently refining the probes for use in the field.

Dinoflagellates, along with microalgae and other small organisms, make up the base of the aquatic food chain and are among the most primitive life forms on earth. But some dinoflagellates can be toxic. Since its discovery in 1991 by Burkholder, an N.C. State University researcher, *Pfiesteria* has been implicated in more than 50 percent of the fish kills in North Carolina coastal waters, notably the Neuse and Pamlico River basins.

Termed an "ambush predator," *Pfiesteria* is difficult to detect since it is can transform between a dormant cyst to a mobile, single-celled zoospore. Scientists are unsure what stimulates this transformation. They have identified more than 23 different stages in the life cycle of *Pfiesteria*, many of which are toxic. The swimming cell emits neurotoxin which strips surface tissue from fish.

Rublee's research involves taking DNA from *Pfiesteria* cells so that the genetic code can be determined, reproduced and used in probes to compare with natural samples. Once they are fine-tuned for field work, the probes can be used to confirm the presence of *Pfiesteria* as a possible cause of fish kills as well as to determine the geographic distribution of the dinoflagellate. Modified probes can be used to test for other similar species that may also threaten estuaries. Researchers hope that knowledge of the organism's distribution, gained by use of the *Pfiesteria* probes, will provide insight into management practices that can reduce fish kills.

—Information courtesy of N.C. Sea Grant

Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

Aug. 2

Bugfest will be held at the N.C. Museum of Natural Sciences in downtown Raleigh. The popular educational program will feature exhibits, displays and activities related to insects and arthropods. The highlight of the free event is the Cafe Insecta where various insect dishes will be served up for tasting. For more information, call Bob Flook at (919) 733-7450.

Sept. 20

Big Sweep, a cleanup of North Carolina's beaches and waterways, will be held from 9 a.m. to 1 p.m. at various locations across the state. This year marks the 11th anniversary of this highly successful program. To volunteer for a cleanup in your area, call (800) 27-SWEEP.

Sept. 27

National Hunting and Fishing Day celebrates its 26th anniversary this year. The day honors the contributions of hunters and anglers to the conservation movement. Check your local newspaper or sportsman's clubs for activities and events.

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through May 1997

Principal Balance
$23,786,508.28

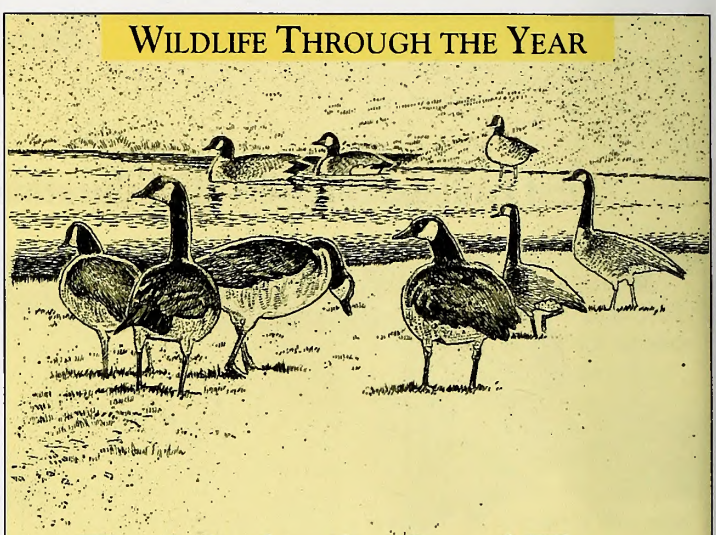
Interest Earned
$22,488,783.08

Total Receipts
$46,275,291.36

Interest Used
$10,050,660.04

Fund Balance
$36,224,631.32

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.



Too Much of a Good Thing

by Rodney Foushee

There are few more graceful sights than a wedge of Canada geese migrating southward beneath a Tar Heel sky. Once a common image, the number of migrant Canadas wintering in North Carolina has plummeted in recent years. At the same time, a population explosion of resident Canada geese, which do not migrate, has begun to cause problems in some areas of the state.

The birds have increasingly taken up year-round residence on golf courses, manicured lawns, suburban ponds and farms. While most people at first welcome these winged visitors, huge flocks of geese can quickly wear out their welcomes and inadvertently cause conflicts with humans.

Congregations of resident Canada geese can overgraze lawns and golf courses leaving large accumulations of feathers and droppings. Health concerns are warranted when large numbers of birds gather at water treatment facilities and swimming areas. Ravenous geese can also damage vegetable gardens and pick valuable field crops clean.

To help landowners deal with potential problems, the N.C. Wildlife Resources Commission has produced an eight-page booklet, *Nuisance Canada Goose Control*. This handy guide provides a list of considerations for effective goose control and details various non-lethal and lethal strategies to disperse flocks of resident geese. Techniques vary from modifying habitat around ponds and lakes with barriers to make areas less attractive to geese to using noise-making devices and chemical repellents. Other options include hunting resident geese during a special season in September, destroying their eggs to lower reproduction and, in extreme cases, trapping and relocating the birds. (A valid hunting license, migratory bird stamp, HIP certification and non-toxic shot are required to hunt Canada geese and a federal permit is required to handle goose eggs. Check the appropriate regulations for more details.)

To obtain the free goose control booklet, write the Wildlife Commission's Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Or call (919) 733-7291.

N.C. WILD STORE

Summer Survival Kit

A comfortable T-shirt, a hat to keep you cool, a good video or book, and you're ready to face these sweltering summer days. Just select your summer survival kit and use the easy-order form in the back of the catalog. Oh, and bring your own hammock.

Our white, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort. Three cap styles and color combinations give every cap fancier a choice.

N.C. WILD T-SHIRT

Pocketless tee has N.C. WILD logo on the front and features a colorful original design on the back. $14.50.

ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

WILDLIFE IN N.C. T-SHIRT

Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. $14.50.

ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

N.C. WILD CAP

N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. $16.50.

ITEM CODE **A1**

WILDLIFE IN N.C. CAP

Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/ stone. $16.50.

ITEM CODE **A2**

WILDLIFE IN N.C. CAP

Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. $16.50.

ITEM CODE **A3**

ALL THINGS ARE CONNECTED

Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. (See page 40 for accompanying teacher's guide.) $20.

ITEM CODE **W1**

DOGS THAT POINT, FISH THAT BITE

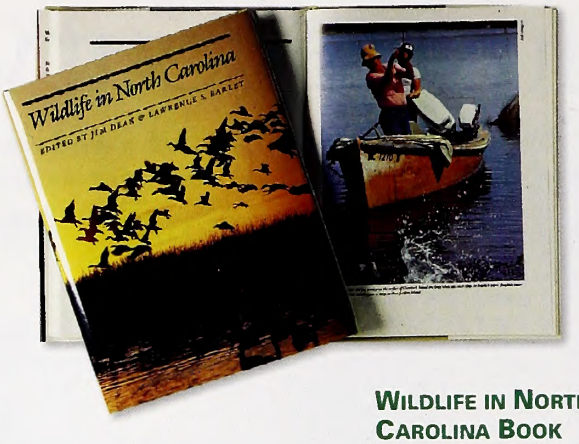
Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. $19.95.

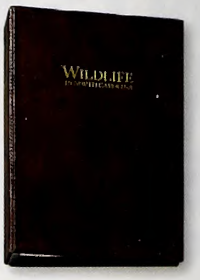
ITEM CODE **M8**

More terrific items

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE





Wildlife in North Carolina Magazine Binder

Store 12 issues of the magazine in this sturdy binder. $10.

ITEM CODE M2

N.C. WILD Notebook 1995-1996

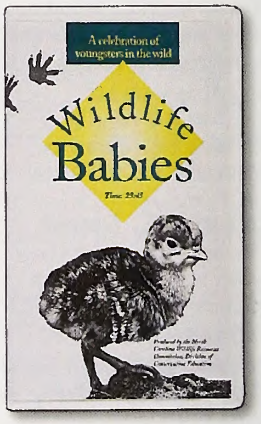
Eight issues of *North Carolina WILD Notebook*, the Wildlife Commission's prize-winning conservation-education newsletter. $3.

ITEM CODE E11

Wildlife in North Carolina Book

The best of *Wildlife in North Carolina* magazine. $12.

ITEM CODE M3



Wildlife Babies

Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20.

ITEM CODE N9

Value Buy! Buy the set and save.

Lizards of N.C.

Shows all 12 of the state's lizard species. 22" x 34". $6.

ITEM CODE P3

Turtles of N.C.

Shows all 21 of the state's turtle species. 22" x 34". $6.

ITEM CODE P4

Snakes of N.C. (Livebearers)

Shows all 17 of the state's livebearing snake species. 22" x 34". $6.

ITEM CODE P5

Snakes of N.C. (Egglayers)

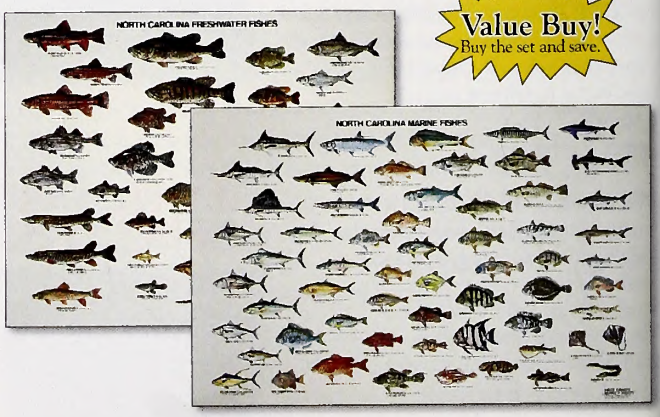
Shows all 19 of the state's egg-laying snake species. 22" x 34". $6.

ITEM CODE P8

Set of 4 Posters

You'll save $6 by purchasing the set of four posters above. $18.

ITEM CODE P10



Value Buy! Buy the set and save.

N.C. Freshwater Fishes

Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6.

ITEM CODE P6

N.C. Marine Fishes

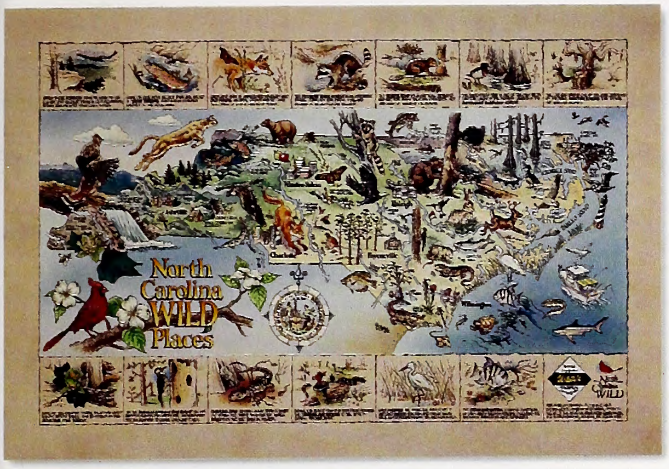
All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6.

ITEM CODE P7

N.C. Freshwater Fishes and N.C. Marine Fishes

Save $2 when you buy both posters as a set. $10.

ITEM CODE P9



North Carolina WILD Places Map

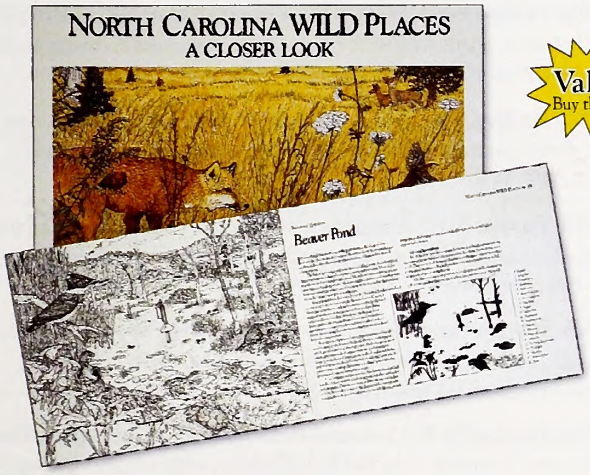
Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4

North Carolina WILD Journal

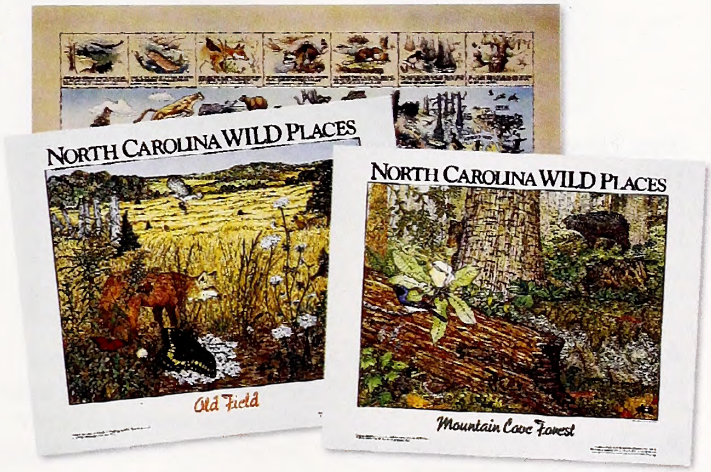
Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7



Value Buy!
Buy the set and save.



North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places book and posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16.
ITEM CODE E6

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look*. 19 1/2" x 16". Shipped folded with poster version of WILD Places Map. $8.
ITEM CODE E5

Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.

Cub & Boy Scout Correlation.
ITEM CODE E9

Girl Scout Correlation.
ITEM CODE E10

Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.

THIS LAND IS SACRED (TEACHER'S GUIDE)

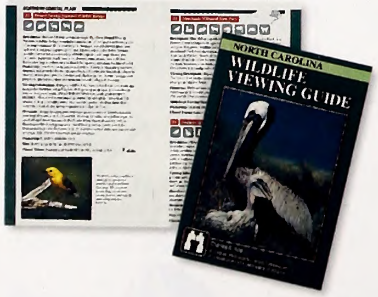
Classroom activities to accompany the All Things Are Connected video. $4.50.
ITEM CODE **W2**

ALL THINGS ARE CONNECTED

(Video sold separately on page 37.)

ALL THINGS ARE CONNECTED & THIS LAND IS SACRED

Video and Teacher's Guide package. $22.
ITEM CODE **W3**

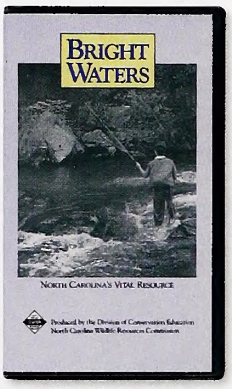


NORTH CAROLINA WILDLIFE VIEWING GUIDE

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95.
ITEM CODE **N6**

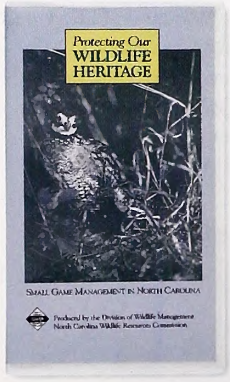
GARDENS FOR BUTTERFLIES

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2.
ITEM CODE **M5**



BRIGHT WATERS (VIDEO)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20.
ITEM CODE **N7**



PROTECTING OUR WILDLIFE HERITAGE (VIDEO)

25-minute video offers useful tips for landowners on managing small game. $20.
ITEM CODE **N8**

WILDLIFE PROFILES

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. $2 ea.

WILDlife Profiles Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard.
ITEM CODE **W4**

WILDlife Profiles Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar.
ITEM CODE **W5**

WILDlife Profiles Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, large-mouth bass, black crappie, channel bass. ITEM CODE **W6**

WILDlife Profiles Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon. ITEM CODE **W7**

WILDlife Profiles Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE **W8**

WILDlife Profiles Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE **W9**

WILDlife Profiles Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab. ITEM CODE **W10**

WILDlife Profiles Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE **W11**

WILDlife Profiles Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE **W12**

WILDlife Profiles Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE **W13**

WILDlife Profiles Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE **W14** NEW

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (___) ___-____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____-____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

→ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
→ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
→ (N.C. residents add 6% sales tax.) ..... **TAX**	$
→ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
→ (Add all items above.) ..... **TOTAL**	$

For credit card orders, provide information below.

CREDIT CARD NUMBER

EXP. DATE

( )
Daytime Phone Number

Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence
☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (___) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

Wildlife Commission **Spotlight**

There is a Free Launch

KEN TAYLOR

Safe Waterways. The Division of Boating and Inland Fisheries also places and maintains over 1,000 navigational aids on all public waters including many locations in the coastal area. Navigational aids include channel markers and "Danger" buoys which division personnel place in hazardous boating areas.

Ramps Aplenty. The boating and fishing public has free access to the state's waters through 167 access areas that have been built and maintained throughout North Carolina. The boating-access program has been administered by the Division of Boating and Inland Fisheries since 1984.

During the past 10 years we have completed 15 new sites and completely renovated or made major improvements to 37 others, in addition to routinely maintaining all existing sites. The Sport Fish Restoration Program enabled us to buy necessary equipment and supplies for completing these projects.

N.C. WILDLIFE RESOURCES COMMISSION

N.C. WILDLIFE RESOURCES COMMISSION

KEN TAYLOR

The User Pays. Boat registration and titling fees help pay for this program, as do revenues from a one sixth of 1 percent state sales tax on motor fuel and federal dollars annually appropriated to the state through the Boating Safety and Sport Fish Restoration programs. This "user pays" program has been very successful. The boating and fishing public provides approximately 95 percent of the funding for this program. Many facility improvements are planned for the future but they depend on the continuation of these funding sources.

Jordan Largemouth

When the bass fishing mysteriously faltered during the early years after Jordan Lake was flooded, biologists suspected poor spawning. As a stop-gap measure until they could figure out exactly what was wrong, they applied a 16-inch minimum size limit that would permit bass to reach spawning size before they could be kept. That regulation has worked so well that the fishing is superb, and it's being helped by a growing ethic among anglers to release most bass.

Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

45
.61/9

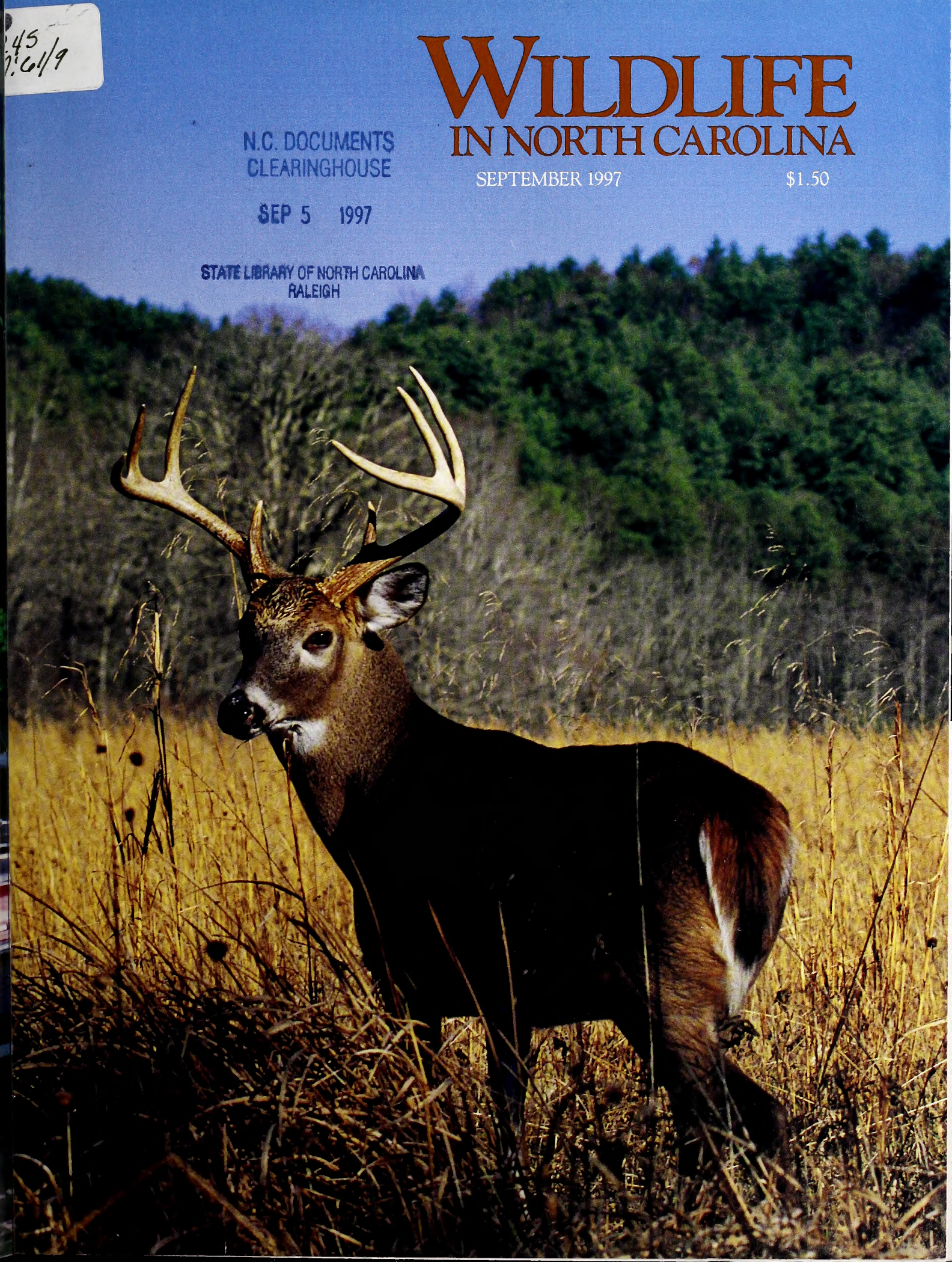
WILDLIFE IN NORTH CAROLINA

SEPTEMBER 1997 $1.50

N.C. DOCUMENTS CLEARINGHOUSE

SEP 5 1997

STATE LIBRARY OF NORTH CAROLINA
RALEIGH



The Truth About Blaze Orange

by Jim Dean

Our mail routinely includes a number of questions about wildlife and natural history, and we always try to answer these authoritatively. Those who pose these questions have, after all, assumed that somebody here is an authority and, if not, we must surely know someone who is. In most instances, questions are honestly answered, but there are occasions when we are honestly stumped. In that case, we notify our respondents that we will hold their questions in a file until a logical answer presents itself, or until the file falls over. Then, we have the choice of throwing the whole mess out and starting over or giving the accumulated inquiries our best offhand shot. The pile collapsed yesterday.

Q — You keep referring to blaze orange without further explanation as though we should know what that is. Please elucidate.

A — You have apparently led a sheltered life. Blaze Orange was an exotic dancer who had a long-time association with a politician in the Florida citrus belt. During the peak of her popularity, her outfit was highly visible at a great distance, even through dim lights and thick smoke. In recent years, hunters virtually everywhere have taken to wearing vests, coats and caps in a bright orange color named in her honor, with the wholly unanticipated benefit that fewer of them are mistaken for deer. Incidentally, her sister, Blaze Broccoli, was linked briefly with the vegetarian movement, but hunters understandably have never held her in high regard.

"During the peak of her popularity, her outfit was highly visible at a great distance, even through dim lights and thick smoke."

Q — I have recently begun reloading ammunition to save money, and have also found it to be an absorbing hobby, but I keep running into a term I don't understand. What is head space?

A — Of course, space is what is most commonly found inside of our heads, but how that applies to ammunition escapes us. If there is a connection, perhaps it will become apparent to you when you go shooting.

Q — The forester who is managing my farm has warned me that I must be diligent in removal of volunteer pines that encroach on my fields. How do you distinguish a pine that has volunteered from one that has been conscripted?

A — Since only advanced silviculturalists understand the language of trees, you will have to take their word for it that pines, in their callow youth, are notoriously quick to volunteer for dangerous missions in fallow fields. Millions, perhaps billions, who have said, "I'll grow here," or echoed "Me, too" have been mercilessly bushhogged. The lesson for us is to let someone else do the volunteering.

Q — Virtually all your articles about white-tailed deer speak of the deer rut. What is that?

A — Deer are such creatures of habit, following the same trails, eating the same foods, etc. that they become bored and are then said to be in a rut.

Q — You speak of a time of year when deer are in velvet. Is this something I can observe?

A — Indeed, some deer, particularly mature bucks, do wear velvet, usually for formal occasions. Black bears, on the other hand, are known to prefer pinstripes, while turkey gobblers seeking mates in the spring favor seersucker suits, bowties and straw boaters.

Q — You recently published an article in which biologists discussed sexing deer? Can that possibly mean what I think it does?

A — We wouldn't presume to guess what you are thinking, but we wouldn't dream of asking any biologists, either. We think the best advice is "Don't ask, don't tell."

Q — I am led to believe that fish finders can help me catch more fish. Where can I find one?

A — We suggest you look under the personals section of any fishing periodical where you will find notices from available, perhaps even desperate, fish. Leave a message on their voice mail, but be aware that not all angelfish are.

Q — Why do you use "harvest" in reference to hunting when you really mean you are killing animals?

A — Yes, we prefer harvest, but we could go either way with this. It's a way of reminding readers that nature provides an excess in all species, a portion of which can be culled or harvested the same as any crop without ill effects on the whole. We personally prefer to avoid any confusion, which is why we killed half a dozen tomatoes for supper last night.

Q — My wife is on my case because I like to watch others fish on TV, but care nothing about actually fishing. She claims this is the pure definition of lazy. What do you think?

A — As someone who frequently dreams he is asleep, we feel obliged to disqualify ourselves.

Until the next pile falls....

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Jonathan B. Howes/Secretary

North Carolina Wildlife Resources Commission

Jim Bennett/Chairman/Greensboro
John E. Pechmann/Vice-Chairman/Fayetteville
C. J. Belch Jr./Roper
Jon Black/Charlotte
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John F. Lentz/Ellerbe
Charles R. Preston/Conover
Eugene Price/Goldsboro
Wes Seegars/Goldsboro
Bobby N. Setzer/Cullowhee
J. Ralph Squires/Charlotte
W. Ray White/Manteo
Arthur J. Williams, III/Washington

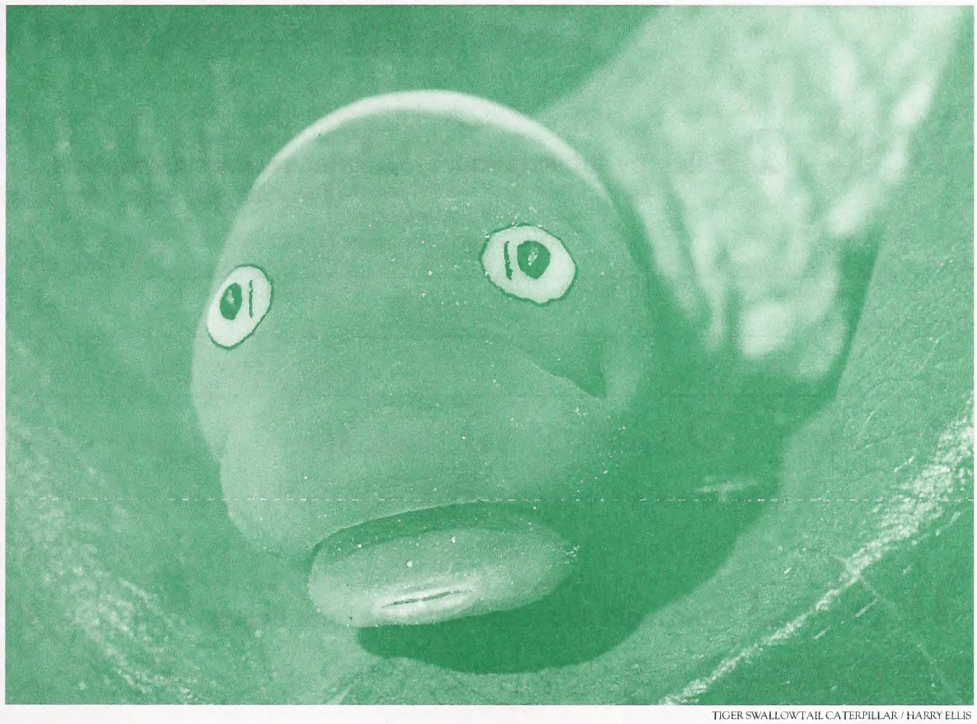
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/ Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education
Gordon S. Myers/Engineering Services

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Donnan Robbins/Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Kimberly K. C. Schott/Assistant Art Director
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants



TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, in October we'll include a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS ☞

MAGAZINE SUBSCRIPTION ORDER FORM

SUM97

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.**
(If renewal, attach recent magazine label.)

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
first name MI last name area code

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** **$**

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** **$**

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** **$**

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE

( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

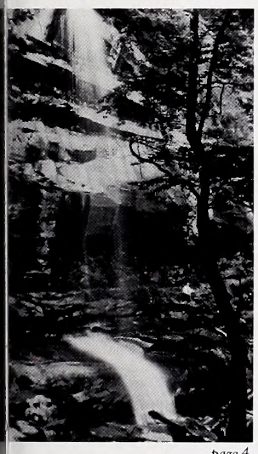
Contents

Wildlife in North Carolina

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

September 1997 *Volume 61, Number 9*

Features



page 4

4 **Early Hikers in the Smokies** *written by Eddie Nickens* ©1997
photographs courtesy of Friends of the Great Smoky Mountains National Park
Some 80 years ago, D.R. Beeson and C. Hodge Mathes began hiking the high country of western North Carolina, and they recorded what they saw in their remarkable journals.

10 **September's Gift** *written and photographed by Mike Gaddis* ©1997
"The very gates of Heaven must be spangled with scuppernong vines...." And guess what happens to the grapes.

14 **Ten Ways to Improve Your Dove Shooting**
written by Eddie Nickens ©1997
photographed by F. Eugene Hester ©1997
It's too late to overhaul your entire hunting form, but it's not too late to leave some bad habits behind.

20 **Hunting Season Roundup, 1997-98**
Here's a rundown of North Carolina's major upcoming hunting seasons.

22 **The Truth Is in the Teeth** *written by Dan Kibler* ©1997
How old is that deer? And why is it so important for game biologists to know?

26 **Flying Cigars** *written by David Lee* ©1997
illustrated by Chris Armstrong ©1997
This is the time of year when swifts put on their most spectacular show.

page 10

page 14

Departments

Our Natural Heritage *by Jim Dean*
Nature's Ways *by Lawrence S. Earley*
Back Porch *by Rodney Foushee*
Wildlife Through the Year *by Rodney Foushee*
Cover *A handsome buck deer stops in mid-field to eye the photographer. Photographed by F. Eugene Hester.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

The Chemical Defenses of Plants

written by Lawrence S. Earley
illustrated by David Williams

The interactions between plants and animals are among the most spectacular in nature although most of us never give them a thought. The pollination of plants by birds, moths and other agents; the dispersal of mycorrhizae by small mammals; the dispersal of plant seeds by fur-bearing animals—they are just a few of the ways that plants have evolved to make animals their unwitting servants.

Plants also have evolved strategies to keep animals away, especially the hungry herbivores—birds, insects, mammals—that roam the earth. The major problem for plants, of course, is that they are pretty much stationary. They can't escape an herbivore by fleeing like an animal, but they can produce chemicals that kill an animal, repel it or otherwise discourage its attentions.

There are many examples of plants' chemical defenses. Some are natural poisons to insects and other small animals. For example, a snail that feeds on a plant called bird's-foot trefoil may be killed by a chemical compound in the plant that releases cyanide.

Other chemicals that plants produce can interfere with an insect predator's normal development from larva to pupa to adult. In one case, a plant produces chemical substances that mimic the insect's growth hormone. As a result, the insect's normal transformation from larva to pupa is blocked and the insect eventually starves to death.

Still other plants produce chemicals that may not be lethal, but may extend the insect's larval stage, its most vulnerable stage in life. Or, as in the case of the tomato plant, they produce chemicals that block the ability of the insect to digest the plant. Through this delicate interaction, the insect is prompted to find other foods with better nutritional value.

Tannins are normal chemical compounds in oak leaves that make them nearly indigestible to insects. Red oaks that have been partially defoliated by gypsy moths have been found to have greater than normal tannin content in their leaves. As a result, the moths that feed on them grow more slowly and produce fewer eggs.

Plant responses to predation are so varied that they sometimes beggar the imagination. Wouldn't it be helpful if humans had the ability to produce flight responses in other humans who menace them? This is exactly what potato plants do when confronted with aphids. The plant releases a chemical substance that imitates the alarm pheromone (a message-carrying odor) emitted by aphids. The insects flee and we are left shaking our heads in amazement.

What biologists who have studied these things have also found out is that these chemical substances are not useful to the plant in any other way. They are purely defensive weapons.

Given the complexity of some of these relationships, is it at all surprising that some animals have been able to detoxify harmful chemicals in plants, or convert the chemicals produced by plants into compounds useful for their own purposes? For example, the caterpillar of the monarch butterfly can feed on poisonous milkweed plants without harm. The poison is carried within its body even after it transforms into a butterfly making it so distasteful that predators like bluejays immediately spit it out.

The viceroy butterfly has benefited from the monarch's "reputation" among bird predators. Strikingly similar to the monarch, this butterfly does not feed on the milkweed and thus is a delectable tidbit for the predator if it only dared, but it is rarely eaten because it looks so much like the monarch.

In Mexico, on the other hand, black-headed grosbeaks and black-backed orioles feed on great quantities of monarchs, although in different ways. The orioles pick the monarchs apart, carefully eating the parts that are not contaminated with the chemical toxin. The grosbeaks eat everything with gusto, since they are immune to the poison.

The lesson is that chemical defenses are sometimes breached, if not by one species then by another. "No defense is inviolate," writes biologist Gerald Rosenthal, "and like the milkweeds, monarch butterflies are not completely protected by their chemical defenses."

Other Reading

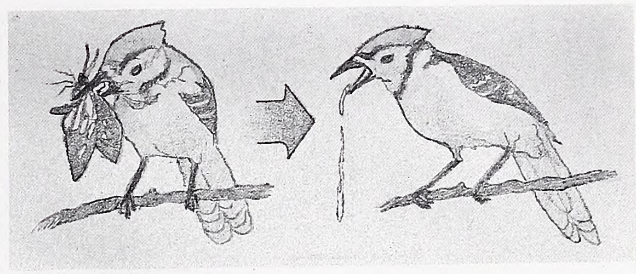
- Gerald A. Rosenthal, "The Chemical Defenses of Higher Plants," *Scientific American* vol. 154, pp. 94-99 (1986).
- George Constantz, "Trees and Caterpillars" in *Hollows, Peepers, and Highlanders: An Appalachian Mountain Ecology* (Mountain Press Publishing, 1994).

Surfing the Web

- At the University of Kentucky web site, you can read Gerald A. Rosenthal's article from *Scientific American* magazine. *Address*: http://www.uky.edu/~garose/link100.htm
- There's an interesting, short article about plant defenses at the Tropical Marketplace web site, an on-line gardening publication. *Address*: http://www.tropicalmarketplace.com/defense.htm

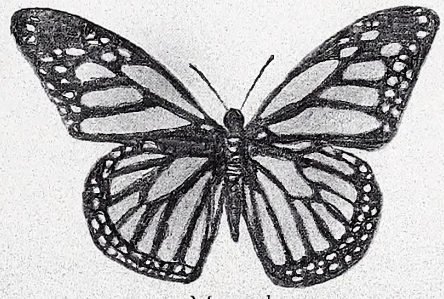
Observations

- Can you think of other "weapons" a plant possesses? How about thorns, spines, the jagged edges of leaves? How about the rashes you get from poison ivy or poison sumac?

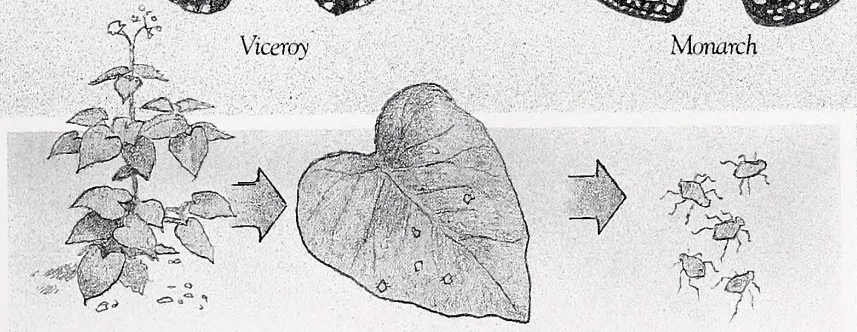


Sometimes animals convert *a plant's chemical defenses to their own uses. The caterpillar of the monarch butterfly feeds on the milkweed plant without harm, but the plant's poisons make the adult butterfly so distasteful the bluejay won't eat it. Benefitting from this are butterflies that look like the monarch, like the viceroy butterfly.*

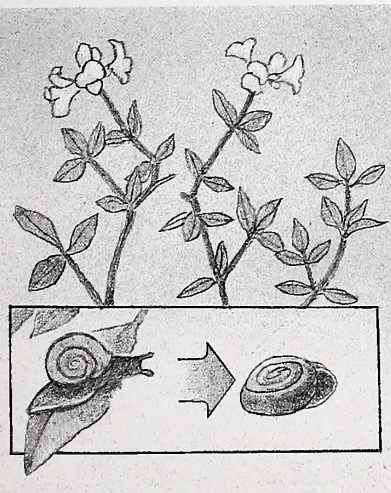
Viceroy



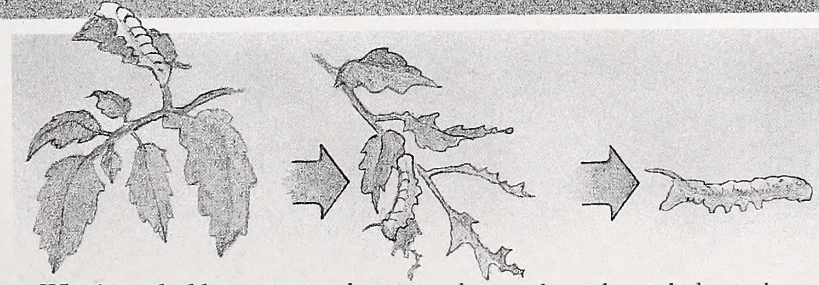
Monarch



When aphids approach the *wild potato, the plant releases chemicals that stimulate the aphid's alarm pheromone. The insects usually flee.*



Some plants have *such potent chemical defenses that they can kill an unwise or unknowledgeable predator. After feasting on the bird's -foot trefoil above, this snail dies. There are also non-lethal defenses. Some plants merely discourage herbivorous insects.*



When attacked by an insect, *the tomato plant produces chemicals that make it difficult for its leaves to be digested. The insect must look elsewhere for more nourishing food.*

EARLY HIKERS IN THE SMOKIES

Some 80 years ago, D.R. Beeson and C. Hodge Mathes began hiking the high country of western North Carolina, and they recorded what they saw in their remarkable journals.

written by Eddie Nickens ©1997
photographs courtesy of Friends of the Great Smoky Mountains National Park

D.R. Beeson (left) *and* **C. Hodge Mathes (right)** *on first day out.*

They struck out on August 28, 1914, just as the deadly chain of events that led to World War I began to uncoil in Europe. Decades before the opening of the Appalachian Trail, two intrepid hikers from just across the Tennessee line started up the head of Dry Valley on the western slopes of the Great Smokies. Bound for Big Creek near the Pigeon River, they carried a tent, blanket rolls, miner's lamps and one extra flannel shirt each. Canned pork-and-beans, two bags of biscuits, a few dozen chocolate bars and a bag of ground, parched corn made up most of the weight in their 30-pound rucksacks. By the time D.R. Beeson and C. Hodge Mathes made it to Pigeon River Gap, they had hiked an estimated 113 miles along the crest of the Great Smokies—essentially the route of today's Appalachian Trail. They had trailed bear tracks, gotten lost numerous times and sneaked past moonshine stills, most of the time bushwhacking through trailless country with rudimentary maps. The payoff was easily explained. "This stupendous mountain scenery has, nevertheless, repaid us for all our hard tramping and the memory of it will always be a source of pleasure to me," Beeson wrote in his journal of the trip. "It's a blessing that such a recollection stays with a man so much longer than the memory of rubbed feet and half rations."

Those are sentiments with which any Appalachian adventurer could relate and, thanks to the Friends of the Great Smoky Mountains National Park and the Archives of Appalachia at East Tennessee State University in Johnson City, those are words that can be read again and again. In December of 1994 the two groups published the first of four Beeson journals in their *In The Spirit Of Adventure* series. Each small paperback recounts a Beeson-Mathes backpacking trip, often in exquisite detail and illustrated with black-and-white photographs Beeson took with a 5x7 camera and tripod he lugged over the rough country.

In 1913 the pair hiked from Roan Mountain across Grandfather Mountain to Blowing Rock. Early in the summer of 1914 Beeson and Mathes and two other men hiked from Linville Falls through the gorge to Table Rock and Hawksbill Mountain and back. Six weeks later the pair struck off through the Smokies, and the next year they tackled the summit of Mount Mitchell, guided in part by Dolph Wilson, son of "Big Tom" Wilson, the famous bear hunter who discovered the body of Dr. Elisha Mitchell after he fell to his death in 1857. After each hike Beeson put together a leather-bound journal with the typed notes taken from his handwritten field journal, illustrated with his best photographs.

Now, modern versions of the Great Smokies, Mount Mitchell, Roan Mountain and Linville Gorge journals have been published. Edited by Charles Maynard, executive director of Friends of the Great Smoky Mountains National Park; Norma Myers, director of the Archives of Appalachia at East Tennesee State University; and Ned Irwin, public services archivist at the Archives of Appalachia, each is a slim volume, easily read in less than an hour. Included in the edited journals are a biography of Beeson, a glossary, maps—the Mount Mitchell journal even includes Mathes' own rendition of the final days of Dr. Elisha Mitchell's life—and all are chock full of homily and insight and a wild North Carolina that today's hikers can only dream, or read, about. From a historian's perspective, Beeson's works have value as documentary. "These are firsthand accounts of what these regions were actually like," says Myers. "Beeson came here with notions drawn from local writers about violent and wild people. You can see his opinions change in his writing." As adventurers, wrote Carson Brewer, a veteran Smokies hiker, Beeson and Mathes "stand about halfway between us and Daniel Boone."

A longtime draftsman for coal and railroad companies, Beeson opened an architecture practice in Johnson City, Tennessee, in 1912. There he met Mathes, an English professor at East Tennessee State University, and the two began a decades-long friendship largely founded on their hiking trips. Perhaps their most epic was the Smokies trip. Thirty years after their sojourn Mathes wrote in an article for the *Potomac Appalachian Trail Club Bulletin* that Horace Kephart set their sights on the crest of the Great Smokies. Kephart's seminal *Our Southern Highlanders* had inspired both Beeson and Mathes, and when they read Kephart's passage that even a "party of axemen" might be stymied in reaching the top of rugged Mount Guyot, Beeson took it as a dare.

They began at the base of Thunderhead Mountain, on a day in which "it rained four times," Beeson wrote, "not counting the showers." The second day out the pair "lost about four miles of distance, some religion and two hours of time" hunting for the herdsmen's cabins near Thunderhead. They rose each morning at 4:30 a.m. to fight boulders, blowdowns, briers and blackberry thickets, some of which "we ate our way through," Beeson wrote. They camped among beech trees "that grow so close together that the moonlight

Locals encountered
camping in Indian Gap.

When they reached the summit of Mt. Guyot it was so crowded with young balsams, Beeson wrote, that "you could get lonesome there on a bright day with all your friends and a brass band."

Photo of Rainbow Falls *(above) showing D. R. Beeson's brother-in-law, Raymond Rankin, standing along right side of falls. Looking northeast from Blowing Rock (right).*

Looking east from *Siler's Bald over the Great Smoky Mountains (above). In camp just beyond Clingman's Dome (right). View of the foothills of the Great Smokies (below).*

can't get through" and found themselves low on food, reduced to a can of beans, biscuits and a candy bar each for the day's rations.

Day after day the two hikers rose in the dark, broke camp and hit the trail. In his signature 16-inch leather boots and necktie, Beeson no doubt cut a rakish figure in the Smokies backcountry. The got lost numerous times, bushwhacked through rhododendron hells and teetered over knife-edge ridges. Not once in the journal does it appear that either lost his sense of humor or his sense of adventure. After one particularly difficult day of boulder hopping Beeson wrote about the difficulties—and the rewards—of such rugged travel:

> *In making camp tonight we have had to build up a flat area for our tent out of stones and branches and dirt, covered with balsam twigs to the thickness of about a foot. We are down from the crest of the ridge at the base of a cliff, having walked the last mile along the ridge, looking in vain for a flat space wide enough, —seven feet,—to pitch our tent on.*
>
> *These moonlight nights in camp are pretty lonesome luxuries and have inspired my Partner to the extent of six quatrains of verse, which he has just read to me. I ought to be sure of good sleep.*

Modern-day backpackers won't be surprised at the prominent role food—or the lack of it—plays in Beeson's journal. Food ran dangerously low, and the men filled their bellies with berries. "Our suppers for the past three nights and for the future are consisting of a couple of handfuls of ground parched corn and a pint of water with a chocolate almond bar for dessert," Beeson wrote. "We are both agreed that chocolate is a necessity on such trips as these." Still, they were undaunted. "The scarcity of provisions," Beeson wrote at the end of the trip, "added zest to the element of uncertainty."

When they reached the summit of Mount Guyot, it was so crowded with young balsams, Beeson wrote, that "you could get lonesome there on a bright day with all your friends and a brass band."Yet there is no disappointment found in the entry. Instead Beeson and Mathes slid 4,000 feet down the mountain, lying flat in order to scoot under the laurels, and popped out in a lumber camp on Big Creek. Their Smokies adventure was over.

The next year Mount Mitchell rose in their sights, and with a bit of bushwhacking experience under their belts, they adjusted their load. They didn't cook or heat up anything but coffee and left the pork-and-beans at home. Their description of backpacking gear should give contemporary high-tech hikers paroxysms: "We have the best packs

yet," Beeson boasted, "a wide strap over each shoulder and made of waterproof stuff."

The pair started out from Dolph Wilson's hotel on May 21, 1915. Beeson recounted the famous feud between Elisha Mitchell and N.C. congressman T.L. Clingman over which of the now-eponymous peaks was the highest. After considerable negotiations he was successful in convincing Dolph Wilson to guide them to the small waterfall where Mitchell died, and on to the top of the highest mountain east of the Rockies.

Beeson actually lost most of his original notes from this trip and produced this journal years later. It was the last journal the two put together, and their last great epic adventure. Beeson's architecture practice was thriving, and Mathes was becoming a passionate spokesman on behalf of teacher education. Still, they founded a small hiking club, A.B.F.M. (Able Bodied and Feeble Minded) and continued to log miles on various trails for decades. Mathes wrote a few books and short stories based on his experiences in the mountains and served as president of East Tennessee State University for 24 years, retiring in 1949 at the age of 70. He taught at a nearby college until he died two years later. D.R. Beeson became intimately involving in Scouting, and walked six miles a day well into his 80s. He died in 1986 at the age of 96.

The trails have changed since Beeson's day. They come with markers, now, and maps. The grassy balds in Beeson's photographs are now pocked with fire cherry and other pioneering shrubs. The views from Thunderhead today include Fontana Lake, and a wide trail from a sprawling parking lot leads to Mount Mitchell's peak. No doubt Beeson and Mathes would be awestruck at the complexity of backpacking gear that has replaced their bedrolls and canvas rucksacks, and no less impressed with freeze-dried sweet-and-sour pork.

Until these books were published, few backpackers had ever heard of D.R. Beeson and Hodge Mathes. Reading them today makes it plain that at least a few things haven't changed since they climbed the Smokies, the Blacks and Grandfather: the distant views of LeConte, the thrill of seeing fresh bear tracks, the sense of accomplishment that soothes away the soreness from the day's climb. That's what drew Beeson and Mathes to Thunderhead and Mitchell and Roan, and what remains to compel us today to trek in their footsteps, 80 years later. ⊠

Two Beeson/Mathes journals—1914 Smoky Mountains and 1915 Mt. Mitchell—are available from Panther Press, P.O. Box 636, Seymour, Tennessee 37865 for $7.95 each plus $1.50 postage and handling, or call (423) 573-5792.

***Pigeon River gap** with eastern end of Great Smokies in background (above, right). Looking northeast from the ridge beyond Thunderhead (below, right).*

September's Gift

"The very gates of Heaven must be spangled with scuppernong vines...."
And guess what happens to the grapes.

written and photographed by Mike Gaddis ©1997

The century-old grapevine stood an honest quarter mile from the big house, rambling about atop stilted, cedar legs at the crest of a hilltop above the old Sheridan mill site, and overlooking the gaily painted meadow bottoms bordering the winding, black vein of Taylor's Creek. The journey there was a pleasant trek through fields of lilting tickseed sunflowers, down wood paths of green moss, ferns and toadstools, and across pastures of butterfly weed and devil's powderpuff.

We went there on a late afternoon, under a waning sun, when the cool air of evening began to rise. It was a loose procession of little order, unencumbered by necessity, and spirits were never lighter.

If the breeze was amenable, you could smell the sweet musk of the ripened grapes well in advance of the vine. In all of Nature, there is no fragrance more singularly exquisite nor alluring. The very gates of Heaven must be spangled with scuppernong vines... at least for a southerner.

With quickened step we would top the rise, and there it beckoned, Eden itself, 100 feet long and 60 wide, guarded only by a few reasonably amiable yellow jackets and an occasional green snake, which would hardly qualify as a bonafide serpent.

No one tarried around a grapevine. You gave yourself up in an impassioned rush. You ate and ate until you couldn't hold anymore... then you backed away for a breather and set in again. Eating a "bait of grapes" is polite Dixie for rampant gluttony under a scuppernong vine.

And finally, when you were full to the gills, you took a bushel-full home and put them up to wine, for a latent toast to September's finest gift.

ILLUSTRATED BY KIMBERLY K.C. SCHOTT

Scuppernong Wine

Here is a very simple and enjoyable recipe that is trouble free and consistently yields a smooth, sweet wine with an exquisite, old-fashioned bouquet. Nineteenth-century legacy: Sidney Walker, deceased, Randolph County.

4 gallons of well-ripened scuppernong grapes

8 pounds of sugar (2 pounds for each gallon of grapes)

fresh, lukewarm tap-water

5-gallon clay crock or glass jug

large stopper for sealing crock or jug

3 feet of clear, ¼-inch plastic tubing

paraffin sealing wax

large drinking glass

Yield: 2½ to 3 gallons wine

Can be made in smaller volume by proportionately varying grapes and sugar. Always use a crock or jug one gallon larger than the gallon volume of grapes used.

Once the wine has been put up, except for checking the drinking glass occasionally to be sure the surface of the water does not fall below the level of your plastic tube, you can forget it until time to take it off. It works its own magic! In two or three days, you will see air bubbles start to form and rise in the drinking glass as the wine starts to "make." The entire process takes about three months. For years, Loretta and I have put the grapes up around mid-September and made a ritual of taking the wine off on New Year's Eve so we can toast the new year. There's no harm, however, in letting it age a few months longer.

When you are ready to take your wine off and open the container, you will find that the hulls have risen to the top and that the pulp has been assimilated into the wine. Carefully drop a siphon tube through the hulls to the bottom of the jug, and siphon. Your wine will tap rich, golden and clean.

We label each yield by year. Some will be better than others; all will be good. The best we save for our most special occasions.

Here's to yours. ⊠

How to Make It

1. Wash grapes well, but not harshly, to cleanse them and remove foreign matter. Ready crock or glass jug by washing and then drying the inside.
2. Prepare to mash washed grapes. Grapes may be mashed by hand or foot. A large wooden pestle works very well with a widemouthed crock.
3. Mash grapes well. Enjoy it. Immerse. Eat a few. Throw some at your lover. You're on your own from there.
4. Put mashed grapes into crock hulls, pulp and all. It is not necessary to separate pulp from hull.
5. After mashing the grapes and placing them into the crock, mix the sugar with luke-warm water. Use only enough water to create a stiff syrup, or slurry.
6. Pour slurry into crock on top of mashed grapes.
7. Place lid on crock and stopper the center hole, or stopper the jug. Before inserting stopper, drill a center hole into stopper that will tightly accept the ¼-inch clear plastic tubing. Let the tubing protrude about a ¼ inch below the bottom of the stopper. Once lid and/or stopper are in place, seal with hot paraffin wax. Work for an airtight seal when the wax dries.
8. Once the paraffin has dried, you are ready to "put the wine up" to make and age. Choose a room-temperature place where it will not have to be disturbed. Fill the drinking glass with tap water and insert the plastic tube from the crock into the glass. This completes the air seal, allowing the gases of the fermenting wine to escape while preventing incoming contamination from the ambient environment—the key to this method. The young wine should also be shielded from light. If you are using a clear glass jug, wrap it completely in black plastic.

Ten Ways to Improve Your Dove Shooting

It's too late to overhaul your entire hunting form, but it's not too late to leave some bad habits behind.

written by Eddie Nickens ©1997
photographed by F. Eugene Hester ©1997

Ah, yes. Opening Day again, is it? And just how is the shooting practice going? And the reloading? Seems that I recall a great many promises spewing forth from you last year, bound and determined at the end of September to never again be embarrassed by your yearly display of miserable shooting. Let me refresh your memory: Next year, you said, as you stuffed seven birds and a half-dozen empty shell boxes into your seat bucket, there would be no excuses. You were gonna practice—a round of sporting clays every weekend, maybe even join a skeet tournament!—and finally take up reloading. Heck, rolling your own shells alone ought to erase most of your bad gunning habits and bring the lowly dove out of the $99.99-per-pound range! And a new gun—that's it! To heck with your trusty thunderbuss, which you have lugged afield lo these many years. Gonna get you a gas-operated semiauto, backbored with a gold trigger. If that don't kill 'em, nothing will!

Next year, of course, is already three-quarters past, and there are you, standing dejectedly in the closet door, hoping that somewhere beneath that pile of dust and cobwebs lies a shotgun. And if it's in working condition, well, that would just be icing on the cake, now wouldn't it?

You are pathetic, you tell yourself. Destined again to be the laughingstock of the dove field. You are beneath contempt, beyond rehabilitation. You are so utterly, utterly...normal.

We have all been there, my friend, some of us more frequently than we care to admit. But guilt and shame, no matter how appropriate, never killed Mr. Graybird, so don't waste time wallowing in self-pity. In fact, don't waste any time at all, because by now you don't have it. Instead, here are 10 tips that will help you become a better dove shot. But get cracking. It may already be too late for Tip #1.

Go to school. Imagine sitting down in the dental chair when the good doctor pulls up his stool, grasps one of those wire utensils that looks like a miniature version of Captain Hook's forearm, and greets you with these words: "Hadn't tried this in years, but granddaddy was a heckuva teeth-puller, so I bet it's in me bones!" You'd bolt for the door, no doubt.

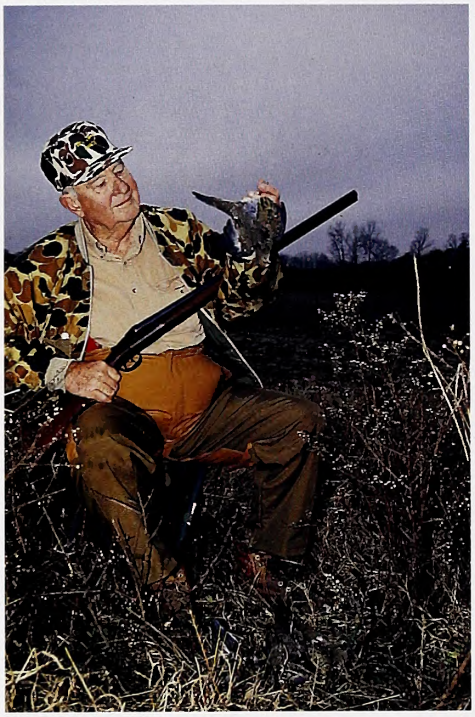
Granted, hitting a dove with a shotshell isn't dental surgery—it's a lot harder! But much the same thing happens each Opening Day when thousands of hunters take to the dove fields, trusting in the natural wing-shooting skills that are their birthright as American sons and daughters of pioneers. It's a particularly native brand of egotism that leads every shotgunner to believe that with a Remington 870 and a couple of boxes of shells he can reawaken the innate accuracy decreed to him along with life, liberty and the pursuit of happiness. Such optimism usually dissolves about half past shooting light, however.

Taking shooting lessons, be they of an hour's duration or a season's, is the absolute best way to learn (or relearn) how to properly shoot a shotgun. They're offered at many shooting ranges and sporting clays clubs throughout the state. In an hour a

Few birds are better designed for speed, so it's no dishonor to seek professional help if your shooting is poor.

good shooting coach can point out bad habits such as jerky gun mounting, flinching and poor follow-through. In a couple of weeks a good coach can turn those habits into memories.

Simply practice. This isn't as easy as it sounds. As popular and exciting as sporting clays is, I'm not convinced it's the best tune-up for hunters who haven't picked up a gun since the end of last season, and especially for those with very little clay bird experience at all. Why? Because the things that make sporting clays fast, fun and challenging—the diversity of target angle, speed and trajectory, the sport's inherent unpredictability—are the same traits that fail to breed proper basic shotgun mounting and shooting mechanics in a marginally experienced gunner. And like it or not, that's what most of us are.



However, shooting standard skeet with a gun in the lowered position trains a hunter to orient the body to the target, develop a fluid and consistent gun-mounting motion, and fine-tune technique on targets that resemble flying doves as closely as any clay bird. And the fact that you can do it over and over again without sneaking the piggy bank out the backdoor means, quite simply, that you'll do it over and over again. Do your preseason tune-ups on the skeet range, and save the sporting clays for when your mechanics are sound and you're ready to make the next leap in skill.

Bill Hinnant (left) *admires a bird he has "reduced to possession." There aren't many lucky shots in dove hunting. You either know how to take a comfortable stance and mount a proper lead (below) or you watch a "miracle" fly away unscathed.*

Watch your step. Two things conspire against hunters to keep their feet tangled in the field. First, the social nature of dove hunting means that you hunt from your paint-bucket stand for a half hour or so, then mosey down the field edge to talk to Joe, who's leaning against the barn. Soon enough Fred shows up and the three of you sit down for a drink of water. That's when the day's first real squadron of birds shows up, at which time you all unscramble femurs, tibia and gun barrels to try and throw lead skyward. Second, once the doves start pouring into a feeding field, they often come from any and all directions, 30 at once and then none at all. Getting on good solid footing—a fundament of proper shotgun technique—is iffy business. This year, think about your feet before you mount your gun. Point your toes toward the bird and get a grip on the ground. Only then will your shoulders swing where you want them to go.

Take your time. Doves fly fast, but not so fast that you need to mount your gun when the bird is still 75 yards away. It's hard not to, especially during those long midafternoon hours when every gnat looks like a dove barreling down your shooting lane and the lone feeders float into the fields with wings barely flapping. But several things happen when you nestle buttplate to shoulder too quickly. First, you lose the natural pointing movement and rhythm inherent in good scattergunning. You bring the gun up, but the bird's still out of range, so all motion stops. It's that much harder to get going again, and nearly impossible to regain the smooth mount, lead and swing that brings birds down. And by moving too soon you're quite likely to flare the dove, which often doubles your target's velocity and sends Ol' Coo into a series of aerial shenanigans for which there is no lead-and-powder remedy. Better to track your target visually and wait to mount the gun when the mounting motion is fluid and seamless with your swing.

Keep your head down. You've heard it a million times, but here's a different twist. Try to track flying birds with your eyeballs turned to the sky, not your face. By watching incoming birds with the top portion of your peripheral vision, you'll automatically keep your head down. Not only will that cut the chances of flaring birds with a shiny face, but once you've brought gun to cheek, your face will be firm against the receiver—where it ought to be. There—you've solved one of shotgunning's most common problems

Hmm. Now that's *five empty hulls and three birds—for sure, that's a better shooting average than most dove hunters can honestly brag about.*

before it ever spoiled a single dove dinner.

Start with the gun muzzle up. Here's another common problem, exacerbated by dove hunting's many opportunities for social commingling and shade-tree snoozing. Many a bird has avoided the dreaded lead sauna because the hunter far below started his swing with muzzle firmly planted in the toe of his hunting boot. Not only is this a bad idea for anyone who ever wants to wear sandals in public, but it's seriously poor shooting form. Never start swinging on a dove until you first point the gun muzzle toward the bird. That way you avoid having to make a dramatic up-and-down correction while swinging on your target, a common mistake that's sent many a game bird chuckling into safe skies.

Use chokes wisely. Rarely is a full choke an intelligent choice for dove hunting. Show me a man who boasts of downing doves at 55 yards with a full-choke gun and I'll be unimpressed, because that man has sent four times the number of birds in his bag wounded and crippled into the trees. That's nothing to brag about. Instead, improved cylinder choke tubes should be your first choice, unless you're passshooting and the nod goes to a modified tube. There have been times while hunting power line cuts and similar physical structures that I thought I could bring down the high flyers with a full choke, but it seems to be the smarter move to move to a place where the birds fly 10 yards closer. I'll trade higher kill ratios at shorter ranges for empty bragging rights of sky-busted birds any Saturday of the season.

These next three tips have little to do with shooting form but will increase the number of birds in the bag by simply altering your hunting tactics. I'm a firm believer in the 10-Yard Doctrine—heck, I'm the author of the 10-Yard Doctrine!—which holds that hunting success doubles when birds can be lured only 10 yards closer. Not only will you have better shots at birds, you'll have more shots at birds. Here's how to do it:

Go into hiding. Sure, it's Opening Day, and the birds aren't spooky. But on average you'll fare better if you wear camouflage or drab clothing and rig some kind of blind. I know, I know: I've seen the hunters in Hawaiian print shirts, and they got their limit. But all that proves is that any knucklehead with a good swing can kill birds when they're flying thick. But what about those years when the birds are harder to find, and blue skies and stiff breezes make them shy? Remember: The goal isn't to lure distant birds to your stand, but get them just a bit closer before flaring.

Use decoys. Nothing will turn a marginal hunt into a smoking-barrel blast faster than well-placed dove decoys. Scoff if you will, but I wouldn't consider leaving my decoys at home, Opening Day or not. Here's what it takes to rig decoys: a large spool of 15- to 20-pound monofilament fishing line, a half dozen 3- and 4-ounce lead fishing weights, a half dozen cheap aluminum tent stakes, and for the true techno-weenie, a collapsible fishing rod outfitted with an old spinning reel. Simply tie a weight to the fishing line and launch it by hand or fishing rod over branches (don't rig them over telephone company or electric utility lines). Snip off the weight, tie your decoy to the line, then hoist the bird up by pulling on the other end of the line. Tie it off to any sturdy vegetation or use the tent pegs. There are commercially available dove trees as well, and they are as effective as they are guffaw-producing.

Mark your bird. Finally, the hardest lesson of all: When a bird goes down, don't take your eyes off the spot. Even the most stoic hunter is humbled time and time again by this rule, for few things in life are more difficult than to pass up shots at incoming birds while searching the field for a dead or crippled dove. But you owe it to the birds and to your own sporting heritage to find downed game before downing more game. And it's worthless to follow the age-old advice to mark the site of a downed dove by remembering which corn tassel was lined up with the distant farm silo triangulated with the dead snag over Ralph's head. You pull the trigger, the dove goes down, you keep your eyes on the spot and walk it out. Pretty soon your pals will be coming to you for shooting lessons. ⊠

***They may look** fake to you, but dove decoys (left) can make a world of difference when it comes to attracting a shootable number of doves. Doves on line (below). Though it's dusk and too late too shoot, these birds are likely to stick around for tomorrow's hunt.*

North Carolina Hunting Seasons 1997-98

Species	Hunting Season	Daily Limit	Possession	Season
Crow	Thurs., Fri., Sat. of each week from June 1 to Feb. 28 plus Labor Day and Christmas Day. (Seasons shown are valid through June 30, 1998)		No restriction	
Dove	Sept. 1-Oct. 4 (12 noon through sunset from Sept. 1 through 6; one-half hour before sunrise to sunset thereafter) Nov. 24-Nov. 29 (all day)* Dec. 17-Jan. 15 (all day)* *Shooting hours are from one-half hour before sunrise until sunset during Nov. 24-29 & Dec. 17-Jan. 15 seasons.	12	24	None
Rails, Moorhens and Gallinules				
Moorhens and Gallinules	Sept. 1-Nov. 8	15	30	None
Clapper Rail, King Rail	Sept. 1-Nov. 8	15	30	None
Sora Rail, Virginia Rail	Sept. 1-Nov. 8	25	25	None
Deer		2	*6	*6
Bow and Arrow	Sept. 8-Oct. 4 (**Eastern) Sept. 8-Oct. 4 and Oct. 13-Nov. 22 (**Western) Sept. 8-Nov. 8 (**Central) Sept. 8-Nov. 15 (Northwestern)			
Muzzleloading	Oct. 6-Oct. 11 (**Eastern) Oct. 6-Oct. 11 (Western) Nov. 10-Nov. 15 (**Central) Nov. 17-Nov. 22 (Northwestern)			
Gun	Oct. 13-Jan. 1 (**Eastern) Nov. 24-Dec. 13 (**Western) Nov. 17-Jan. 1 (**Central) Nov. 24-Dec. 13 (**Northwestern)			
Gun Either Sex and Special Either Sex	See *1997-98 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*			
Black Bear	See *Regulations Digest.*	1	1	1

Gray Squirrel	Oct. 13-Jan. 31	***8	16	75
Fox Squirrel	Oct. 13-Dec. 31 (Only in 20 counties. Season closed elsewhere. See *Regulations Digest*)	***1	2	10
Common Snipe	Nov. 14-Feb. 28	8	16	None
Quail	Nov. 22-Feb. 28	8	16	None
Ruffed Grouse	Oct. 13-Feb. 28	3	6	30
Raccoon and Opossum	****Oct. 13 (sunrise)-Jan. 31 (Western season) ****Oct. 20 (sunrise)-Feb. 28 (Eastern season)	No restriction on opossum. See *Regulations Digest* for bag limits on raccoon.		
Rabbit	Nov. 22-Feb. 28	5	10	75
Rabbit—Box Trapping	Nov. 22-Feb. 28			
Pheasant—Nonnative Male Pheasant Only	Nov. 22-Jan. 31	3	6	30
Woodcock	Dec.19-Jan. 17	3	6	None
Bobcat	****Oct. 13-Feb.28	No restriction		
Fox	See *Regulations Digest*			
Groundhog	No closed season or bag limits.			
Coyote	No closed season or bag limits.			
Nutria	No closed season or bag limits (except Currituck County, see *Regulations Digest*).			
Wild Turkey Bearded Turkey Only	****April 11-May 9	1	2	2
Canada Geese	Sept. 2-Sept. 30 (Except *****NE counties) Sept. 2-Sept. 20 (*****NE counties) Closed in Currituck and Dare counties)	3	6	None
Migratory Waterfowl	Federal regulations may be obtained by contacting license agent or by calling toll free 1-800-675-0263 after Labor Day.			

* Two of which must be antlerless, see *Regulations Digest*.

** See *1997-98 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons. For a copy of the *Digest*, write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

*** Total limit of 8 squirrels per day of which one can be a fox squirrel.

**** Season varies by county; see *1997-98 Regulations Digest*.

*****Counties in NE Season are: Bertie, Camden, Chowan, Hyde, Pasquotank, Perquimans, Tyrrell and Washington.

The Truth Is in the Teeth

How old is that deer? And why is it so important for game biologists to know?

written by Dan Kibler ©1997

The hunters would begin to show up around 10 o'clock; that was the word from David Sawyer. When you give 'em a chance to shoot and tag their deer in the first hour of daylight, drag it out of the woods, and bring it to a check station, you come up with 10 a.m.

It was opening day of gun season for whitetail deer in the northwestern corner of North Carolina. Sawyer, a district wildlife biologist with the N.C. Wildlife Resources Commission, had set up his station in the parking lot of a wildlife cooperator agent's country store/tackle shop just south of Wilkesboro. He got out his log books, calipers and measuring tape, hung a scale from a strong overhanging beam, and prepared for the onslaught.

The "traffic jam" started right on time, and for 90 minutes, hunters steadily brought their deer—big and small—out of the woods to the check station. Sawyer and Tim Lemon of Wilkesboro, a former enforcement officer who is an education specialist for the Commission, took close looks at a dozen or more deer, about two-thirds of them bucks.

Each deer was weighed, and the bucks had their antlers measured for inside spread and thickness at the base. The number of points was also recorded. All of the information was noted and logged into Sawyer's records, then a lower jawbone was removed from each deer and marked so the biologist could later determine the animal's age and match it up with records on its size. Combined with similar data gathered at six other checking stations across northwest North Carolina on a half dozen different days during the season, this information will help biologists judge the deer herd's makeup, its sex and age structure, and its overall health.

These same figures will be fed into a computer, and Scott Osborne of Sanford, the Commission's big-game project leader, can compare them with data from deer across the state to determine which area has the best habitat and track any subtle trends that might indicate changes taking place in the deer herd.

What was the most important piece of data that Sawyer obtained? Certainly, it was the age of the deer, because without that, there's no way to make comparisons or determine what the deer herd looks like and if it is healthy or stressed from overpopulation.

"What you look for is the physical condition of the deer by age class. You compare 1½-year-old deer from one area against 1½-year-old deer from another, and 2½, and on up," Osborne said. "That's why there is the need to know the age of the deer.

"It's like this: if you want to compare the physical condition of deer in area A and area B, you don't need to be in area A on opening week, collecting samples, if 90 percent of the bucks you see are a year and a half old, then go to area B during the peak of the rut, where you see 50 percent of the bucks are older bucks.

"That's like comparing the average size and weight of boys in two different high schools when you go to one school one day, then you go to the other school on a day when the football team is out of town on a trip. You don't get the bigger kids in the sample. It's the same thing with deer; you don't want to be comparing apples with oranges. You want to compare deer in the same age classes."

So determining the age of the deer is vitally important, and the best tool is a whitetail's lower jawbone. The presence or absence of certain "baby teeth" can indicate the age of a deer up to 18 months old. Beyond that age, the wear that a deer's teeth show is considered the easiest way to determine whether a deer is 2½, 3½ or even older.

With the age of a deer determined by district biologists around the state, Osborne can look at figures reflecting the average size of deer in local herds at various ages and determine whether or not an area is overpopulated. If so, he can decide if a change in harvest regulations—such as a longer either-sex season—is warranted.

"The way it's supposed to work is, as the number of deer increases, to a certain point, nothing changes, but at some point, when the herd gets at or above what the food and cover in an area can support, you should see a decline in the condition of the deer," Osborne said. "That can show up in the body weight of the deer and, in bucks, in the antler growth.

"Barring something like a complete acorn failure in one area, the conditions ought to stay fairly comparable from year to year. We haven't seen a lot of year-to-year variations across the state, and I think we owe that to two factors. One, our deer herd has not reached a level where you'd see a decline in condition; and, two, in many parts of our deer herd, if the habitat is a limiting characteristic, it's more limiting in terms of the quality of the food that the deer can get instead of the quantity. There is a lot of food out there, even if it sometimes isn't the best quality."

Knowing the age of deer that are harvested helps Osborne develop a population model that can show him what the herd looked like, in terms of sex and age ratios, before the season started. Then, factoring in the harvest, he can come up with a good look at the characteristics of the deer that survived the hunting season and are left to breed.

"How many deer do we have? How many were taken out? What can we predict for next year? That's the most important data that we can get," Osborne said.

When North Carolina biologists look at samples obtained at check stations or through hunting clubs involved in the Deer Management Assistance Plan (DMAP), they key on three age groups: fawns (less than one year old), juveniles (1½ years old) and adults (2½ years and older). Even though hunters—and biologists—like to compare body weights and antler growth as bucks get older and approach the age when they can become "trophies," for most of the survey work the Commission does, breaking the deer down into fawns, juveniles and adults is all biologists need. And that's also enough to allow hunters to do a little bragging as far as comparing the size of bucks their areas can produce.

For example, according to statistics obtained during the 1995 deer season, the biggest bucks in North Carolina, in terms of body weight, are in the northern foothill

***Wildlife biologists** can tell a lot about the overall health of a deer herd by knowing the age of deer, and teeth are a far more reliable indicator of age than the number of antler points.*

TERRY SHANKLE

Steve Juhan (left) *and Harlan Hall measure the antler spread of a buck. By also removing a jaw, marking it and matching it up with weight, sex, antler development and other data, wildlife biologists can get a good comparison of the relative health of deer herds in various parts of the state.*

counties of Iredell, Davie, Forsyth, Yadkin, Stokes and Surry. The average 1½-year-old buck from those counties weighs 128.1 pounds; at 2½, it weighs 160.6 pounds. That's compared to an average of 103.8 and 130.2 pounds for deer from the lower Cape Fear basin (Sampson, Bladen, Duplin, Pender, New Hanover, Brunswick and Columbus counties), or 99.4 and 119 pounds for deer from the southern Pisgah (Madison, Haywood, Buncombe, Transylvania, Henderson and Polk counties).

The biggest bucks in terms of antler size were found in the southern Piedmont (Anson, Stanly, Union, Montgomery, Cabarrus, Rowan, Davidson and Randolph counties). The average 2½-year-old buck in those counties sported a rack measuring 13.22 inches inside spread and carrying 7.2 points. Only 3 percent of all bucks in that area, in that age group, carried spikes. Compare that with the southern Pamlico area (Beaufort, Craven, Pamlico, Carteret, Onslow and Jones counties), where the average 2½-year-old buck had 4.8 points and an 8½-inch inside spread; 22 percent were spikes.

"Antler sizes will be better in areas with better habitat or in areas with lower deer density, where bucks don't have as much competition for the highest-quality, highest-protein foods," said Sawyer, measuring the spread and mass of a cowhorn buck brought to the Wilkes County check station.

The only real problem involved in sampling deer brought to check-in stations or taken by DMAP club members is the limited number of deer biologists are able to sample. In 1984, for example, Osborne was able to build his database from 20,844 whitetails measured and aged across the state—22 percent of the statewide harvest. In 1995, however, he had only 7,311 deer in his survey, or 5.9 pecent of the total harvest.

"But we still feel pretty good about our statewide data," Osborne said. "We've had the population double in the past 10 years, most any way you can look at it, and a lot of states have to go on only 2 or 3 percent samplings.

"A lot of our decline in the numbers has been because of the decline in DMAP participation," he said. "A big percentage of our data, early on, was coming from DMAP clubs. We've gone from sampling 15,000 deer from DMAP areas to 5,472 in 1995. But there were some problem areas with that data. We had some clubs that did a great job taking out jawbones and weighing deer, then we had some clubs where all the deer weighed 90 pounds, 100 pounds, 110 pounds. You never saw a 93-pound deer in the survey, so you had to wonder if they were real weights or only estimates.

"Now, a higher percentage of our data comes from our biologists, who are trained to age deer from the jawbones. So we're getting a lower percentage of data, but better-quality data."

Sawyer, who has only a handful of DMAP clubs in the 11 counties he covers, fears that changes in seasons and harvest regulations will hurt his ability to sample the herd in northwest North Carolina.

"The any-day doe tag has taken away from days that were traditional peak days in the harvest, which are days we staff the checking stations," he said. "And you can report your deer over the phone now (through the Commission's 1-800-IGOTONE toll-free number), and that probably keeps us from sampling some deer.

"I hope we get about 300 (through check stations in his area), which would be about 3 percent of the total harvest. Plus, I'll get another 150 to 200 from the four clubs we have on the DMAP that have to keep jawbones and record weights for us.

"But we need to see as many deer as we can to make sure our sample and statistics are as good as they can be. That's why it's probably more important to register your kill, since we're looking at fewer deer every season."

Osborne said the Commission may go away from the actual judging of jawbones to determine age, using data gathered since 1981 to paint the portrait of an "average" deer in certain age classes. "We're 95 percent sure that when a deer comes into one of our cooperators, at a check station, if the main beams are 6 to 17 millimeters thick, it's an 18-month-old buck. If they're more than 17 millimeters, it's an adult buck.

"If we want to work toward an increase in the size of our sample, we have a lot of cooperator agents who would be glad to record antler measurements for us, then we could plug in our numbers and determine which percentage of the bucks they've measured are yearlings and adults." ⊠

Judging Deer Teeth

Judging how old a deer is by looking at its teeth is as easy as 1-2-3.

In fact, counting "one, two, three" is the key to being able to determine if a deer is a fawn, juvenile or adult from the placement and wear on its teeth.

First of all, forget the little sharp incisor teeth at the front of a deer's jaw. You're interested only in the deer's six back teeth—three premolars and three molars.

It takes only about 10 seconds to look at a deer's lower jawbone and place it into the fawn, juvenile (18 months old) or adult (2½ years or older) category. "Almost anyone can be taught to place a deer in one of three classes," said biologist David Sawyer of Traphill. "Those are the three groups that are important, because about 85 percent of the antlered bucks taken in this state are 18-month-old bucks. What you want to determine is whether or not a buck has survived its first season with horns."

Adult deer have six back teeth on each side in the lower jaw. The first three are premolars—essentially "baby" teeth that will be shed and replaced as a deer ages. The adult molars are usually in place by the end of a deer's second year of life.

MELISSA McGAW

***Judging the age of** a deer by using its teeth is as easy as 1-2-3. Well, almost. A fawn (bottom) will have only four back teeth. A juvenile (second from bottom) will have six back teeth but the last tooth will have only barely broken through the gum and the third tooth will appear wider than the others. Adult deer (top three) will have all six teeth fully developed. As adults grow older, their back teeth become worn and appear increasingly darker.*

A deer that is less than one year old, one killed during the same calendar year that it was born, will have only four back teeth on each side—three smaller premolars and one permanent molar in the back.

A deer in its second year—if it's a buck, it's wearing its first set of antlers—will have all six back teeth, but often the sixth molar will have barely broken through the gum line. The big indicator, however, is the third tooth in line, the final "premolar." A deer sheds this tooth and replaces it with an adult tooth at about 19 to 20 months of age—often in late December or January of its second year. The "baby tooth" will have three distinct points, or "cusps," and will be "wider" than the surrounding teeth. If a deer has this three-cusped premolar, it is most certainly an 18-month-old deer.

A deer whose third premolar has only two cusps is at least 19 or 20 months old. In deer this age, the sixth, or back, molar often has not completely broken through the gum line. If the sixth tooth is completely broken through the gum line, it is almost certainly a 2½-year-old deer. If it's a buck, the deer is wearing its second set of antlers.

Beyond 2½ years, a deer's age is determined by signs of wear on the chewing surface of the three back molars. The technical term is "dental attrition," and it describes how much of the white enamel surface of the tooth has been worn away by chewing. The white enamel surface of the molars will wear away with age, leaving the darker pulp of the tooth—the "dentine"—showing.

Start with the third premolar and work back. For each molar, add one year if there is more dark dentine showing than white enamel.

For instance, a 3½-year-old deer will have more dark dentine showing on its fourth tooth than enamel, but its fifth and sixth teeth will have less dentine than enamel. A 4½-year-old deer will have more dentine showing on its fourth and fifth teeth, but less on the sixth. A 5½-year-old deer will have more dentine than enamel showing on the chewing surface of all three back molars.

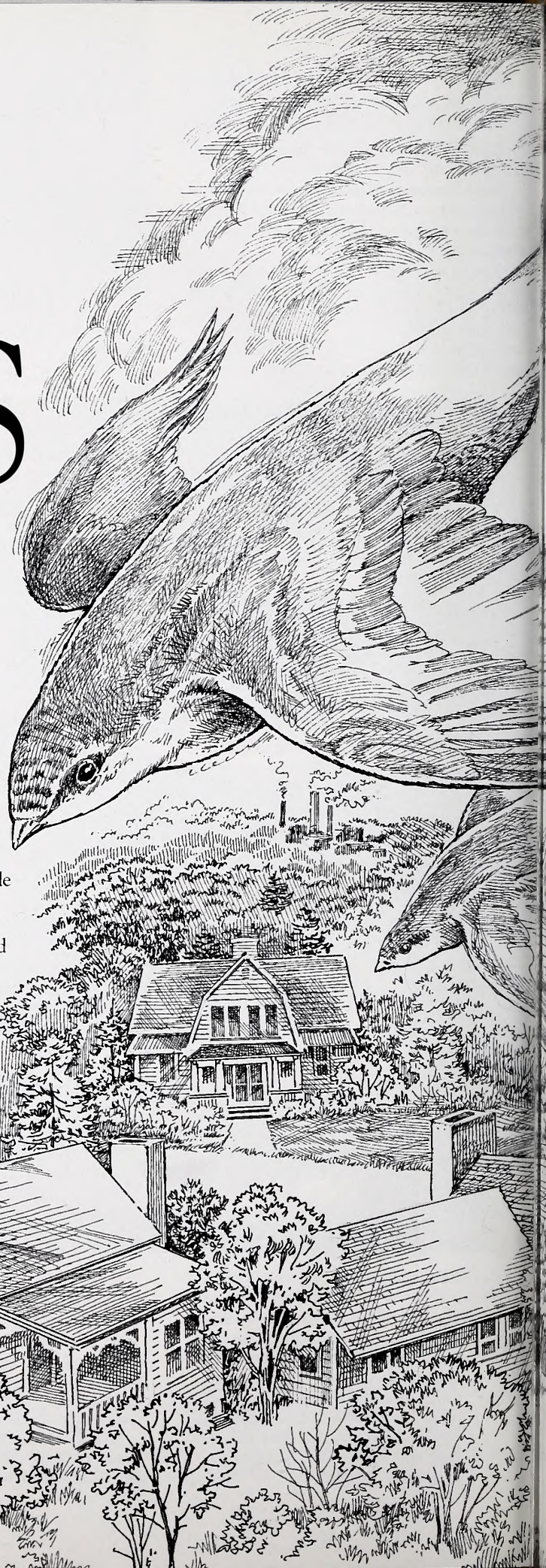
Beyond 5½ years, it becomes more difficult to determine the age of a deer without calipers that measure the amount of tooth left above the gum line. The older a deer is, the more the tooth is worn away, leaving less tooth showing above the gum line. At extremely old ages, the sharp edges of the inside (lingual) and outside (buccal) of the tooth are worn away.

The oldest deer that Scott Osborne, the Commission's big-game project leader, has ever seen was 14½ and was taken near Moncure. Osborne got a look at the deer's jaw when a hunter brought the deer to him to show him some particularly gnarled horns. "The deer was wearing a tag that identified him as one of the deer we had stocked around Jordan Lake. The year he was stocked, he'd been judged as 2½ years old," Osborne said. "He was killed 12 years later."

The tag and records of the deer put it at 14½, not the jawbone. The teeth were worn down so badly that Osborne couldn't have aged it accurately.

"It's not a perfect science," Sawyer said. "You could take 25 jaws from deer between 3½ and 5½ years old, and go to 10 different biologists, and you'd get a lot of different opinions. But most hunters can look at a deer's jaw and put it in one of the three main categories—fawn, yearling or adult—and that's what matters most."

FLYING CIGARS



This is the time of year when swifts put on their most spectacular show.

written by David Lee ©1997
illustrated by Chris Armstrong ©1997

The common names of many plants and animals are highly appropriate. Swifts, for example, are well named. These birds normally fly at speeds of 60 or 70 mph, but they can achieve much higher speeds. Clocking the spine-tailed swift in northern India in 1934, researchers documented that these birds flew at speeds between 172 and 219.5 mph. This has led the *Guinness Book of World Records* to conclude that "this bird is probably the fastest moving living creature."

Perhaps so, but I suspect that if one were to clock some of the other 67 species of swifts, a few might prove to be even faster. One observer reported watching a swift circle an airplane that was traveling at 85 mph. Swifts can even handle high winds, and have been seen circling in normal flight inside the eyes of hurricanes. The flight of birds is symbolic of freedom, and hummingbirds probably epitomize its perfection. But all things considered, swifts are the uncontested masters of flight when it comes to endurance and speed.

The endurance and speed of the swift's flight are results of its peculiar shape. All swifts have streamlined, cylindrical-shaped bodies and short, stiff tails, like our chimney swift of eastern North America. I have heard bird-watchers describe them several times as flying cigars. Based on their torpedo shape and uniform coloration, this is an appropriate description. The wings are thin, long and pointed, and they curve back in a graceful crescent. The wingbeats are rapid, shallow and interspersed with short glides, and the wings beat so fast that they are hard to follow with the eye. What makes swifts excellent flyers and gives them power is the wing design itself. The upper arm bone, the humerus, is short and stout. The wing, therefore, is formed by the elongated elements beyond the

"elbow." The short, stiff humerus gives the working portion of the wing greater strength in that it protrudes directly from the body. The wings don't bend, so there is no flapping motion that one typically sees in avian flight. This arrangement allows the large flight muscles attached to the bird's sternum to have tremendous leverage. The design is not new; fossils from the Oligocene in France tell us that cigar-shaped swifts have been flying around for at least 40 million years.

Swifts probably spend more time in the air than any other land bird, and they fly so efficiently that they need little rest. Two European species are believed to sleep in flight, and while the evidence is not irrefutable, it is likely that they do. Alpine swifts, on clear evenings, have been seen climbing high into the sky until lost from view. It is possible that they enter secret roosts after dark, or do they sleep high aloft? Common swifts observed along the English coast have been seen flying out to sea at dusk and returning at dawn. From where? It seems that spending the night on the wing is a possibility.

If swift flight is so efficient, why have other birds not developed similar designs? In all nature, benefits always have a price tag. Swifts are all but helpless when not in flight. They can't take off from flat ground, and their wing development has been at the expense of their landing gear. You won't see swifts perched on limbs, telephone lines or rooftops. Swifts roost like tripods, clinging to vertical surfaces with sharp toenails, and they support their upright position with stiff, bristled tails. When at rest they conceal themselves in cliffs, caves, hollow trees and chimneys. Speed also robs them of maneuverability; the same inflexibility in their flight feathers that gives them power also prohibits controlled flight in enclosed spaces. Thus swifts are birds of the open sky, and here they are masters of their environment. They are not only well adapted for such flight, they have almost no competition for the aerial insects on which they feed.

Thousands of feet above us, the air is filled with small creatures, drifting, flying, swirling and gliding on convection currents. Spiders ballooning upward on long silken threads, for example, have been captured nearly 3 miles above the earth, and many types of insects have been captured at 6,000 to 16,000 feet. Aviators have reported swifts at 6,000-foot altitudes, and it is believed that swifts commonly fly above moisture-laden clouds in search of insects that have been carried aloft on warm air currents. Other birds may migrate at these altitudes, but swifts are the only ones that regularly forage here.

A swift's rapid wing movements make it difficult to separate illusion from what is really taking place. As the birds rocket and turn, their wings seem to beat alternately. When viewed from below, the birds appear to have erratic

FLYING CIGARS

flights, and some scientists have described this wing movement as flickering. The blurring wingbeats make it unclear what is going on, but clearly swifts don't fly like ducks, herons or sparrows. High-speed photography has confirmed, however, what any schoolboy could see, and what a few ornithologists have tried to explain as impossible: Some swifts do move one wing faster than the other. Just as in rowing a boat, stronger and faster strokes on one side will cause a turn. The stubby tail also helps direct flight, and this is the way most birds turn, bank and change elevation. But because of the swift's speed, its tail rudder needs assistance. So when swifts are in hot pursuit of tasty insects, they steer with their wings. The degree of alternate wing use, however, is an illusion caused, in part, by the bird's wing cadence—a flutter, flutter, float along, alternately banking first left and then right. It's something you need to study for yourself. Find a good location and squander a few hours. Charge it to self-education.

Chimney swifts begin to arrive in North Carolina in early spring, and they are here in numbers by mid-April. They can't afford to arrive too early because they need to be sure that the skys are warm enough to support a variety of airborne insects. Some 95 percent of their diet consists of flies, various plant hoppers, small bees and wasps, mayflies and stone flies. On occasion, this diet is seasoned with beetles, true bugs, caddis flies and ballooning spiders. Chimney swifts do not normally feed in the vicinity of their nests. Anecdotal information indicates that they normally forage 1 to 4 miles away.

During the summer I am forever getting phone calls at the museum where I work about chimney swifts that fall out of nests and end up in people's fireplaces. A similar number of calls are directed to our curator of mammals, and many callers assume that the naked little swiftlets are bats that were living in their chimneys. (One wonders why anyone would have trouble distinguishing a swift from a bat, even though our native bats and swifts have similar ecological roles.) With fallen swift nestlings, there's not much you can do except to get the young birds back inside the chimney, close the flue, and hope the parent birds will be able to locate them. This should work in that the chicks are quite vocal.

Young swifts are interesting. Ones from the same nest are often different sizes, suggesting that the parents start incubation of the first egg before the others are laid. However, some studies do not support this. Chimney swifts typically lay three to five eggs. The parents take turns incubating, trading off about every half hour. If you are fortunate enough to have swifts in your chimney, you can listen to their comings and goings as they flit about in the chimney. After 19 days the eggs hatch. The young are blind, naked, essentially helpless and, by anyone's definition, quite ugly.

Swifts are the only birds to come with their own superglue. The nest is glued to the side of the chimney with the saliva of the parents. To reinforce the structure, the sticks are also glued to each other.

The parents feed the young regurgitated bug juice for the first week or so and then begin feeding them whole insects. By the 12th day, the young are well feathered and actually look like birds. By the 19th day, they are ready to leave the nest. Again, if your chimney is blessed with swifts, you will be ready for them to leave. The squabbling, hungry young produce a loud, ratchetlike "chuh-chuh-chuh" unlike the begging calls of any other bird I have heard. The bad news is that you can hear them 50 feet away.

Before the arrival of the brick chimney in North America, chimney swifts roosted and nested exclusively in large hollow trees. As the forests were cleared and the land planted with crops, fewer and fewer natural roosts remained. By the turn of the century the swift's transition to man-made chimneys was virtually complete. Only a handful of reports for this century exist of swifts in natural roosts. They still use trees, but natural roosts are essentially restricted to ancient-growth trees. I have seen them entering the 1,200-year-old (and older) cypress along the Black River and using hollow tulip poplars at least 300 years old in Joyce Kilmer Memorial Forest. Both forests are composed largely of uncut timber. Even if by chance any of our forests were left uncut, it would take hundreds of years before our second-growth forests obtained the large hollow trees required by these birds. I suppose if one looked carefully at a lot of old single trees, some might still be used by swifts.

The shift to chimneys was natural because they are solid, hollow and in many ways superior to trees. The rough surfaces of the bricks and mortar provide excellent holds for the birds' toes and anchors for their supporting spiny tails. The thermal qualities of the brick provide uniform temperatures, and the structure of the chimney ensures a good airflow. Chimneys are also nearly predator-free. However, many new homes are being built without fireplaces, or the chimneys are made of triple-wall pipe or provide only a facade for gas logs. New, unvented gas logs have all the advantages of a hearth fire with none of the mess, but there is no need for a functional chimney. Yesterday's chimneys are not about to be dismantled anytime soon, but I wonder if the invention of the heat pump will be the eventual undoing of chimney swifts.

For nests inside the chimneys, swifts glue little platforms made of small twigs from the tips of dead limbs snapped off while on the wing. Often swifts must make several passes before they capture a twig in their bills. The nests are unlined, simply a raw, half-saucer-shaped, open-twig construction. It's a clumsy and flimsy-looking structure, but solid. The structure allows the chicks lots of footholds and makes it unlikely that, as they grow larger and the nest becomes overcrowded, they will fall out. Most chicks that fall, I suspect, do so when the entire nest breaks loose from the brick. Often several years of previous nests, and a number of still older remnant nests, can be found in a given chimney.

Swifts are the only birds to come with their own superglue. The nest is glued to the side of the chimney with the saliva of the parents. To reinforce the structure, the sticks are also glued to each other.

This glue—well, technically it is bird spit—is the prime ingredient in bird's nest soup made from the nests of gray and gray-rumped swiftlets of Malaysia and Indochina. No need to pick twigs out of your soup,

however, since these swifts make their nests entirely from saliva. This centuries-old Oriental gastronomic treat is still a thriving business, and hundreds of thousands of dollars worth of nests are harvested from high limestone sea cliffs each year. For reasons long forgotten, years ago I purchased a large can of bird's nest soup. Its label is peeling, but it still sits on a back shelf in our pantry. Someday the wrong houseguest will overstay a welcome and will be served a large bowl of well-aged swift spit.

After completing their nesting chores, the swifts have just over a month to get ready for migration. Feathers become faded by the sun and weatherbeaten as in other birds, and the swift's tails and wingtips in particular are often in poor shape from rubbing against chimney bricks. Molting the feathers is a necessary and systematic process of renewal. Starting with the inner primary flight feathers, each is replaced in turn. The feathers, shed in pairs, leave a narrow matching gap on each wing. Since the flight feathers are longer as they progress forward on the wing, it is critical that they molt in matched sets to maintain even weight balance. By replacing only one pair at a time, the molting process ensures that the bird's flight is less encumbered. At this time of year the demands on the bird are fewer, insects are more abundant and the frenzied responsibility of feeding young is over. The refeathering of the tail and body follows once the wing feathers have been replaced. All is done in an orderly

FLYING CIGARS

fashion that allows continued maximum lift and balance. As each new feather develops, it is sealed off and blood flow into the growing feather stops. Some swifts are still molting at the onset of migration, but most are finished before late September.

Each fall chimney swifts stage spectacular autumn roundups across eastern North America as they migrate, stopping to roost in chimneys along the way— perhaps spending several days or longer in some spots (like elderly snowbirds heading to Florida). The migration starts sometime in September, perhaps triggered by a few crisp mornings. The swifts begin to assemble, first in the dozens, then the hundreds and, as their departure time grows nearer, in the thousands. The scene is the same whether witnessed in Boston, Baltimore, Birmingham, or downtown Burlington.

Well before dusk, the swifts begin to assemble, flying haphazardly around a chimney they have preselected as a roosting place for the night. As the light diminishes, their maneuvering assumes a more organized pattern, and the wheeling flock grows in size and increases its momentum. The cyclone-shaped flock twists and turns with perfect unity. Only in huge schools of open-water marine fish is such precision equaled. If you watch closely and concentrate on individual birds, you can see that on each pass of the wheeling mass a few birds break off and disappear into the chimney. As the light grows fainter, larger numbers of the chittering birds seem to be sucked in. Repeated estimates show that more than 10,000 individuals may roost in individual chimneys on a given night. During peak entrance times, more that 15 birds per second enter. At times it looks as if some invisible force is literally pouring the swifts into the chimney's opening from a large, invisible barrel. The first birds to enter form rows 4 or 5 feet below the entrance. Later arrivals perch beneath them, and by nightfall the insides of favorite roosts are living masses of birds lining every inch of space deep down into the chimneys. Sometimes space is at a premium and the birds will stack three deep. Even after they are in the roost, the swifts continue to chatter, usually for only half an hour or so after dark, sometimes all night. There is also the sound of beating wings. As swifts jockey for position, or lose their grips, they slap their wings together behind their backs in an attempt to regain footholds.

***Indians in Peru** discovered the wintering area for chimney swifts when they turned in leg bands they had collected while smoking out large hollow trees in search of food. They showed the little "bracelets" to a priest who turned them in.*

Unlike most of our neotropical migrants, chimney swifts migrate during the day, resting at night in the security of chimneys. They are one of the last of our migrants to leave and are usually still around as the first flights of waterfowl move south for the winter. For me, their disappearance is the final act of summer.

It was easy to get my students interested in swifts, and not hard to get them to show up after hours to watch the autumn show. It was predictable and it was free. To give them something to pass the time—it took an hour and a half or so from the time the first swifts showed themselves until the last had put itself to bed—I tried to get the students to try to figure out what triggered their mass entry. Before long several students had calculated formula to calibrate the f-stop readings on their cameras into footcandles. Each night they measured the intensity of activity against falling light levels. Not only did they get a strong positive correlation, but they found that as the days became shorter, the swifts turned in sooner. On cloudy evenings or rainy ones, when the measure of footcandles was well below what was normal for that time of evening, the swifts retired even sooner. Over a period of several weeks, the students, studying the built-in light meters in their cameras, learned that they could predict exactly when the swifts' downward funneling would begin. A few enterprising students even won small wagers from others who thought the whole show to be some bizarre random event.

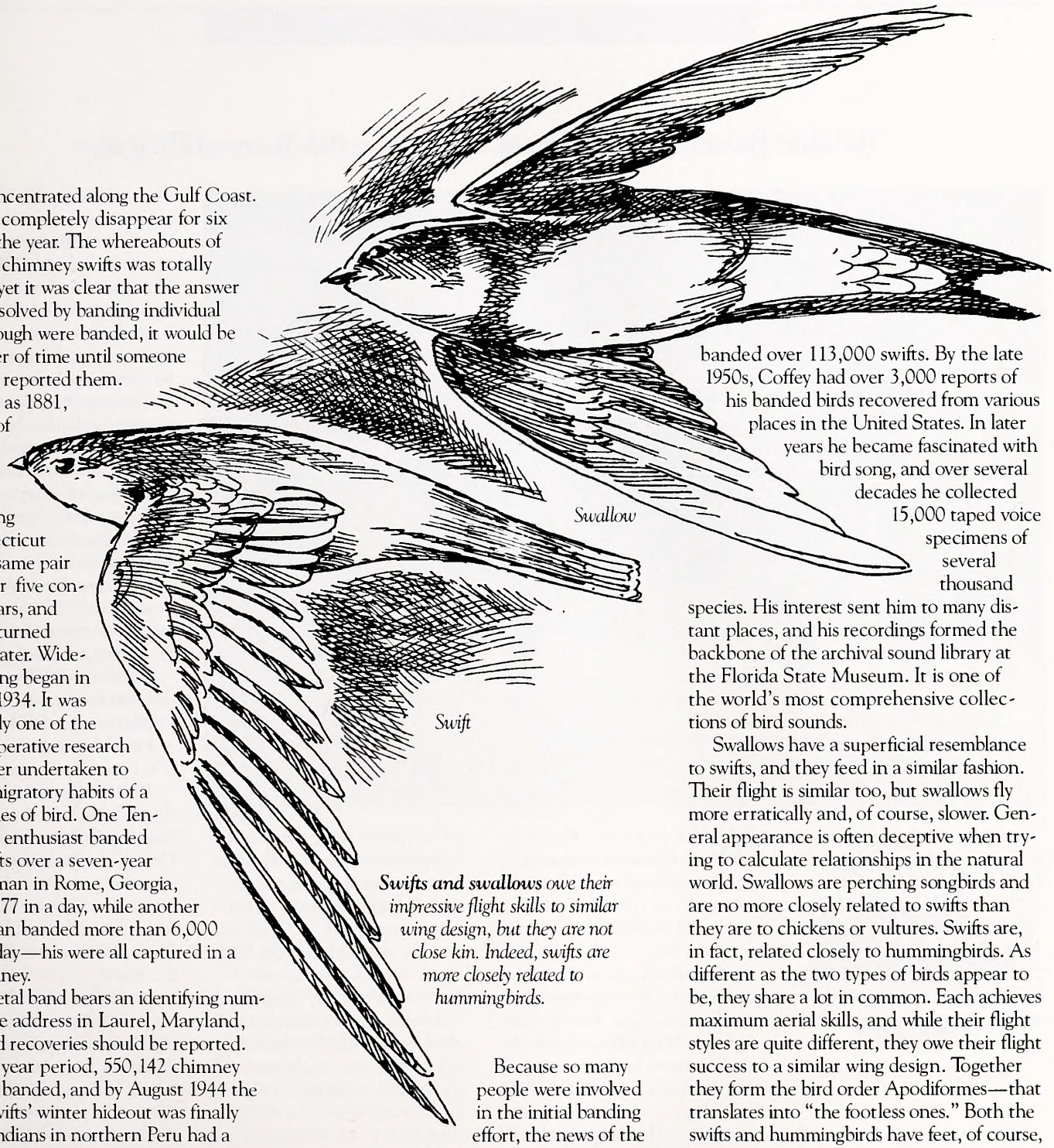
And here is the best part. Large industrialized cites have the biggest and best chimneys. Warmth coming from deep within large buildings and factories gets the swifts through chilly nights. So here is a spectacular natural event that one does not need to go to the Serengeti Plain or the Antarctic to see. With a little scouting in any city, you should find a number of fall roost sites. Some house more birds than others, but the key is to find one with a good vantage point. I have found that swifts, and swift-watchers, use the same sites year after year. Changes occur only when eager new building supervisors fire up the heating systems too early and the swifts are forced to find alternate roosts.

Fifty years ago the winter whereabouts of chimney swifts remained unknown—we don't really know exactly where many of our migratory birds go. For example, the redstarts in your yard could winter in eastern Mexico, northern South America or the Bahamas. Still, we generally know the overall winter range of each species. As for chimney swifts, no one had any idea where they spent their winters. In the fall they wing their way south, and large numbers

become concentrated along the Gulf Coast. Then they completely disappear for six months of the year. The whereabouts of millions of chimney swifts was totally unknown, yet it was clear that the answer could be resolved by banding individual birds. If enough were banded, it would be just a matter of time until someone somewhere reported them.

As early as 1881, little rings of wire were put on a pair of swifts nesting in a Connecticut barn. The same pair returned for five consecutive years, and one bird returned nine years later. Wide-scale banding began in earnest in 1934. It was undoubtedly one of the largest cooperative research projects ever undertaken to learn the migratory habits of a single species of bird. One Tennessee bird enthusiast banded 28,412 swifts over a seven-year period. A man in Rome, Georgia, banded 7,377 in a day, while another Georgia man banded more than 6,000 swifts in a day—his were all captured in a single chimney.

Each metal band bears an identifying number and the address in Laurel, Maryland, where band recoveries should be reported. Over a 22-year period, 550,142 chimney swifts were banded, and by August 1944 the chimney swifts' winter hideout was finally revealed. Indians in northern Peru had a habit of smoking out large hollow trees in their search for food. The previous winter they smoked out a large flock of swifts. Thirteen had leg bands. Fascinated by the little bracelets, the hunters showed them to their priest. The bands were turned in to the U.S. Embassy in Lima and eventually sent to Laurel. Since then only one other winter band record has been turned in—it was also from an area in the upper Amazon in Peru and only about 540 miles from the 1944 recovery. The winter retreat of chimney swifts would probably still remain unknown if it were not for this massive banding project.



***Swifts and swallows** owe their impressive flight skills to similar wing design, but they are not close kin. Indeed, swifts are more closely related to hummingbirds.*

Because so many people were involved in the initial banding effort, the news of the wintering area did not go unnoticed. Scout troops and kindred groups had participated in the study, and numbers of people became deeply interested in birds and bird conservation as result of seeing the payback for their volunteer efforts. When the first bands were recovered, their numbers were checked against the centralized banding lists. The birds in the single smoked tree in Peru had been banded over a wide area—Illinois, Alabama, Georgia, Tennessee, Connecticut and Ontario. Five of the 13 swifts were banded by Ben Coffey in Memphis. It was a fitting reward for his efforts. He had personally banded over 113,000 swifts. By the late 1950s, Coffey had over 3,000 reports of his banded birds recovered from various places in the United States. In later years he became fascinated with bird song, and over several decades he collected 15,000 taped voice specimens of several thousand species. His interest sent him to many distant places, and his recordings formed the backbone of the archival sound library at the Florida State Museum. It is one of the world's most comprehensive collections of bird sounds.

Swallows have a superficial resemblance to swifts, and they feed in a similar fashion. Their flight is similar too, but swallows fly more erratically and, of course, slower. General appearance is often deceptive when trying to calculate relationships in the natural world. Swallows are perching songbirds and are no more closely related to swifts than they are to chickens or vultures. Swifts are, in fact, related closely to hummingbirds. As different as the two types of birds appear to be, they share a lot in common. Each achieves maximum aerial skills, and while their flight styles are quite different, they owe their flight success to a similar wing design. Together they form the bird order Apodiformes—that translates into "the footless ones." Both the swifts and hummingbirds have feet, of course, but compared to other birds, their legs and feet are poorly developed. Swifts and hummingbirds also possess a number of distinctive reproductive similarities.

Most birds command attention because of colorful plumage, graceful flight, hunting skills or beautiful complex songs. It is nice to include some other attributes on the list of reasons we admire our avian friends. Look skyward on the next warm summer's evening and behold the chimney swift zipping about on stiff, asynchronous wings—cigar-shaped birds that glue untidy nests inside your chimney with spit. ⊠

Wildlife Restoration Program Celebrates 60 Years of Progress

LEONARD LEE RUE, III

***The white-tailed deer is** just one of the many success stories of the Federal Aid in Wildlife Restoration Act, commonly called Pittman-Robertson. Since its inception in 1937, Pittman-Robertson has provided more than $3 billion for wildlife management and hunter safety programs.*

Written and Edited by Rodney Foushee

What began as a response to the rapid decline of game species in the 1930s has proven to be America's most successful wildlife conservation program ever.

This month marks the 60th anniversary of the passage of the Federal Aid in Wildlife Restoration Act, commonly called the Pittman-Robertson Act. The landmark legislation, passed by Congress at the urging of the nation's hunting community, placed a federal excise tax on firearms and ammunition to be used solely to fund state wildlife conservation projects. President Franklin D. Roosevelt signed the bill into law Sept. 2, 1937.

Since its inception, the program has provided more than $3.2 billion to state conservation agencies for wildlife restoration, habitat improvement and acquisition, wildlife research and hunter safety programs. North Carolina has received $67.3 million since the program began with about $2 million in grants currently going to the N.C. Wildlife Resources Commission each year.

"The significance of this funding to North Carolina cannot be underestimated," said Hal Atkinson, wildlife management chief for the Wildlife Commission. "The vast majority of the wildlife restoration and research programs in the state have been possible thanks to the support of hunters through Pittman-Robertson."

The program's grants have been largely responsible for the recovery of white-tailed deer and wild turkeys in North Carolina. Grants have also been used to help restore river otters in western North Carolina and monitor black bear populations statewide.

Nationally, numerous species have rebuilt their populations and expanded their ranges since the 1930s thanks to Pittman-Robertson, including the pronghorn antelope, wood duck, beaver, Rocky Mountain elk, desert bighorn sheep, bobcat and mountain lion. Many other non-game birds and animals have also benefited from the habitat created for game species. Hunter safety courses funded by the program have also helped greatly reduce hunting accidents nationwide.

In North Carolina, Pittman-Robertson funds have helped the Wildlife Resources Commission purchase more than 50,000 acres in game lands and manage more than 2 million acres of public and private land for wildlife habitat and public hunting.

Besides its wildlife restoration and hunter safety successes, Pittman-Robertson has served as a model for newer conservation programs.

In 1950, Congress passed the Federal Aid in Sport Fish Restoration Act, now known as Dingell- Johnson, that applies an excise tax on fishing tackle, electric trolling motors and sonar fish finders. In 1984, the Wallop-Breaux amendments increased revenue for sport fish restoration by extending the tax to more sporting equipment, motorboat fuels and import duties on fishing tackle and pleasure boats. These funds support sport fish habitat improvements, fish stocking, research and boat ramp construction.

A new grassroots funding initiative, called Teaming With Wildlife, proposes a similar "user pays" plan which would raise millions of dollars per year for songbirds and other non-game species through a small tax on bird seed, bird feeders, cameras and outdoor recreation equipment. All are based on the "user pays" principle developed through the Pittman-Robertson Act.

N.C. Hunters for the Hungry Set for New Hunting Season

Tar Heel sportsmen are gearing up for another busy year for the North Carolina Hunters for the Hungry program. Last year, deer hunters statewide donated about 33,000 pounds of venison to feed the needy through the program. That brings the overall total since the non-profit group began four years ago to more than 85,000 pounds.

Donated deer are processed into ground venison and distributed to homeless shelters, soup kitchens and food banks across the state. Each deer, served in pasta dishes and soups, can feed about 120 people.

Donated deer must be harvested, tagged and reported in accordance with N.C. Wildlife Resources Commission regulations. The program also accepts deer legally harvested in other states.

Below is a list of participating meat processors as of the end of July. Please call for hours of operation:

Beaufort County
Lloyd's Custom Meats
Hwy. 264 East (8 miles east of Belhaven)
Belhaven, N.C.
(919) 943-2209

Bladen County
Clarkton Processing Co.
Railroad Street
Clarkton, N.C.
(910) 647-8191

Cumberland County
Super K Wholesale Meats
105 S. Broad St.
Fayetteville, N.C.
(910) 483-1777

Davidson County
Midway Meats Inc.
3282 Clodfelter Road
Winston-Salem, N.C.
(910) 764-2684

Franklin County
Pearce's Custom Processing
Perdue's Road (S.R. 1430)
Louisburg, N.C.
(919) 496-3152

Guilford County
Griffin Meat
Highway 65
(8041 Belews Creek Road)
Stokesdale, N.C.
(910) 643-4524

Curtis Hayes
1912 Harris Drive
Greensboro, N.C.
(910) 852-0026

Ernie Shue
8123 Lariat Drive
Summerfield, N.C.
(910) 643-1060

Henderson County
Henderson's Meats
911 Staton Road
Flat Rock, N.C.
(704) 692-4553

Johnston County
Custom Meat Processing
963 Old Johnson Road
Wendell, N.C.
(919) 365-9406

Jones County
Riverside Meat Inc.
504 Landfill Road
Trenton, N.C.
(919) 448-4047

Lee County
O'Connell's Super Market
109 E. Main St.
Sanford, N.C.
(919) 776-2412

Northampton County
Vincent Meat Co.
Barn Street
Gaston, N.C.
(919) 537-3429

Onslow County
Community Meat Center
1710 Piney Green Road
Jacksonville, N.C.
(910) 353-4676

Pender County
Clark's Sausage & Pork Outlet
4800 N.C. Hwy. 133
Rocky Point, N.C.
(910) 675-0358

Wells Pork Products
750 Croomsbridge Road
Burgaw, N.C.
(910) 259-2523

Perquimans County
Layden Meats
Highway 37
Belvidere, N.C.
(919) 297-2191

Pitt County
Pollard Trading Post
100 Pollard St.
Greenville, N.C.
(919) 758-2277

Rockingham County
Richards Meats & Things
1403 S. Scales St.
Reidsville, N.C.
(910) 342-1881

Sampson County
Andy Powell
5694 Taylor's Bridge Hwy.
Clinton, N.C.
(910) 592-8495

Stanly County
South Stanly Packing Plant
Rocky River Springs Road
Norwood, N.C.
(704) 474-4030

Thompson & Son
1718 Blanch Ave.
Albemarle, N.C.
(704) 982-6946
(704) 982-1298 (home)

Union County
Frontier Meats
8303 Lancaster Highway
Waxhaw, N.C.
(704) 843-3921

Wake County
Country Corner Grocery
604 Jones Dairy Road
Wake Forest, N.C.
(919) 556-8300

Yancey County
Parsley's Grocery Inc.
Rt. 2, Hwy. 19-E
Burnsville, N.C.
(704) 675-4764

Additional processors will likely be added by hunting season. For an updated list or for more information on how to participate in the program, contact N.C. Hunters for the Hungry, P.O. Box 10502, Raleigh, N.C. 27605-0502, or call (919) 557-8090.

NORTH CAROLINA HUNTERS FOR THE HUNGRY

Taking Aim Against Hunger

First Outdoors Woman Program Proves Successful

KEN TAYLOR

Wildlife Enforcement Officer
Linda Guedalia (right) teaches rifle marksmanship at North Carolina's first Becoming an Outdoors Woman workshop. Other courses included fishing, canoeing, camping, turkey calling and wildlife photography.

The N.C. Wildlife Resources Commission's first Becoming an Outdoors Woman (BOW) workshop proved even more successful than organizers expected. And plans are underway for future workshops to help women continue to improve their outdoor skills and knowledge.

"It was a wonderful experience to see so many women learn about the outdoors and gain confidence in their skills," said Lt. Randy Thomas, the Wildlife Commission's safety coordinator who supervises the BOW program.

North Carolina's first BOW workshop, held May 30-June 1 at Western Carolina University in Cullowhee, featured a variety of outdoor courses designed to offer instruction to women in a relaxed non-intimidating atmosphere. Many of the 101 women who attended the workshop have continued to improve their outdoor skills and have even passed on tips to their husbands, fathers and brothers.

"We just opened the door for learning," Lt. Thomas said. "The women's enthusiasm is the real key to the success of the program."

The workshop is part of a national program to break down the psychological and social barriers that have historically prevented women from enjoying outdoor activities including hunting and fishing. Future North Carolina BOW workshop are in the works.

"Our plans are to hold one workshop a year and rotate the location around the state to give everyone a chance to attend," Lt. Thomas said. To receive information about upcoming BOW events, write Lt. Thomas at the N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604.

Outdoor Calendar of Events

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

Sept. 6-7

The 16th annual Currituck Wildlife Festival will be held at the historic Whalehead Club in Corolla. Events will include waterfowl calling contests, decoy competitions, woodcarving and painting demonstrations, retriever demonstrations and an auction. Wildlife art and various antique decoys, boats and guns will also be displayed. For more information, call Nancy Bray at (919) 232-3297.

Sept. 20

Big Sweep, a cleanup of North Carolina's beaches and waterways, will be held from 9 a.m. to 1 p.m. at various locations across the state. This year marks the 11th anniversary of this highly successful program. To volunteer for a cleanup in your area, call (800) 27-SWEEP.

Sept. 27

National Hunting and Fishing Day celebrates its 26th anniversary this year. The day honors the contributions of hunters and anglers to the conservation movement. Check your local newspaper or sportsman's clubs for activities and events.

Oct. 4-12

The North Carolina Zoo in Asheboro will sponsor its fourth annual juried art show, titled *An Eye on Nature*. Featured art themes will focus on wildlife diversity, conservation and environmental protection. The show will be held in the W. David Stedman Education Center at the zoo with artwork available for sale. For more information, call Debbie Kennedy at (910) 879-7453.

Blue Ridge Parkway Foundation Forms

A new organization has been chartered to support the most visited site in the National Park system.

The Blue Ridge Parkway Foundation, based in Winston-Salem, is a private, not-for-profit organization that will raise money to support ongoing programs of the parkway, including visitor services, education, preservation and conservation efforts.

"Like all national parks, the Blue Ridge Parkway suffers from modest federal appropriations and increased competition for the limited funds that are available," said parkway superintendent Gary Everhardt. "The parkway welcomes the foundation as its partner to help meet the growing needs of this unique American institution which hosts more than 20 million visitors each year."

Besides its priceless beauty, the parkway is a driving economic force in the mountains. A recent N.C. State University study found that the Blue Ridge Parkway injects $2.2 billion annually into the economies of North Carolina and Virginia.

"The Blue Ridge Parkway is not just a showcase for the natural beauty of North Carolina and Virginia, but an outstanding economic asset," said foundation executive director Houck Medford. "We owe it to our communities, ourselves and our children to do whatever we can to preserve the parkway's scenic beauty, its cultural and natural heritage."

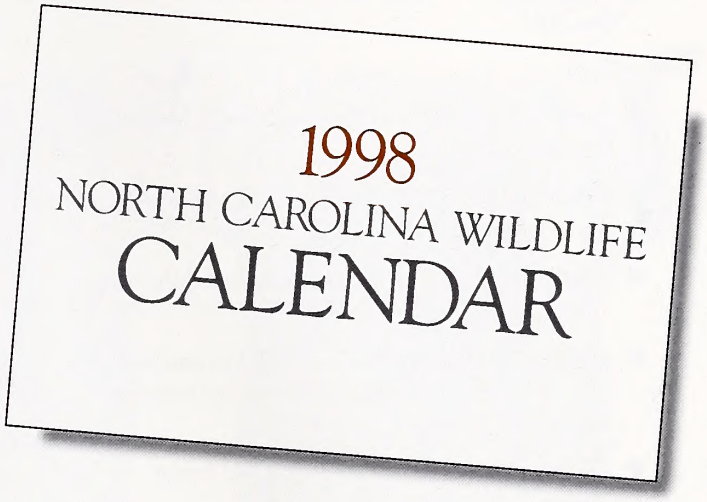
The foundation, which is in the process of developing long-term fundraising plans, has already received nearly $10,000 in gifts and contributions. For more information about the Blue Ridge Parkway Foundation, write them at P.O. Box 10427, Salem Station, Winston-Salem, N.C. 27103.

New Wildlife Chairman Chosen

MELISSA McGAW

New Wildlife Resources Commission Chairman *Jim Bennett of Greensboro (left) accepts the gavel from outgoing Chairman John Lentz of Ellerbe. Bennett, who recently was appointed by Gov. Jim Hunt to a six-year term as commissioner for Wildlife District 5, was elected to serve a two-year term as chairman at the commission's July meeting. John Pechmann of Fayetteville was elected vice chairman. Arthur J. Williams III of Washington and Wes Seegars of Goldsboro were also sworn in as new wildlife commissioners. W. Ray White of Manteo was to be sworn in in August.*

The 1998 North Carolina Wildlife Calendar is Here!



With such fine artwork as Robert C. Flowers' "Winter Maidens" (featured on the inside back cover), the 1998 North Carolina Wildlife Calendar is sure to sell out. In addition to Flowers, the works of James A. Brooks, Robert B. Dance, Dempsey Essick, Bob Herr, Denise Nelson, Duane Raver and Raney G. Rogers are featured.

Order yours today! Payment must accompany your order. Calendar orders may be charged to VISA or MasterCard, or enclose your check or money order (payable to NCWRC). Complete the form below and mail with payment to:

1998 Calendar, N.C. Wildlife Resources Commission
512 N. Salisbury Street, Raleigh, N.C. 27604-1188
(Office is located at 322 Chapanoke Road in Raleigh.)

GREAT CHRISTMAS GIFT!

Please send me _____ Calendars at $6.00 each . . . . . .$_____

All N.C. residents add $.36 sales tax per calendar . . . . . _____

☐ Enclosed is my check for **total** payment of . . . . . .$_____

☐ Charge to MasterCard or VISA for the calendar(s) ordered above. My card number is _____ and the expiration date is _____/_____.

_____ (_____)_____
Card holder signature | Day Time Phone No.

If ordering 7 or more calendars, please provide your UPS deliverable address.

Name _____

Address _____

City/State/Zip_____

Phone (_____) _____

All orders must be prepaid. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512). **For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CAL098

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.
- Connect to the Commission's online web site at **http://www.state.nc.us/Wildlife/**

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through June 1997

Principal Balance
$23,890,682.98

Interest Earned
$22,741,733.51

Total Receipts
$46,632,416.49

Interest Used
$12,329,807.04

Fund Balance
$34,302,609.45

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.

Food for Thought

by Rodney Foushee

Nature can seem cruel at times. Frigid weather, drought, violent storms and even too much reproductive success can leave unwitting birds and animals at the mercy of a harsh system where there is sometimes not enough food to survive.

In September, with the bounty of the fall harvest at hand, it can be easy to forget. But starvation is simply a reality of the natural world.

Scientists point out that this system, far from cruel, culls the weak and makes room for the strongest to survive and continue the natural cycle. But humans often intervene and try to give wildlife that extra boost to make it through the upcoming hard months.

While there is nothing wrong with improving habitat to provide wildlife with natural food, caution should always be used when directly feeding wild animals. Sometimes a few seemingly harmless handfuls of grain can have disastrous results.

"Baiting" deer and feeding wildlife with corn are both common practices in North Carolina that can have harmful effects on a variety of animals, especially wild turkeys. While feed corn can be highly nutritious, it can also harbor aflatoxin poisons produced by a mold that grows in moist conditions on corn. All animals, including humans, are susceptible to these naturally occurring toxins. But young ducks, turkeys and quail are especially vulnerable. Even low levels of aflatoxin can cause liver damage and reduced weight gains in young turkeys and shut down egg production in adult birds.

To protect turkeys and other wild fowl, feeding corn to wildlife should be discontinued especially during the spring when young birds are most susceptible, according to the Wildlife Commission's Wild Turkey Project Leader Mike Seamster.

Those who continue to bait deer with corn should use only high-quality feed that is certified "aflatoxin-free." Protecting the stored grain from moisture and putting out only small quantities that will be exposed to the elements for no more than a few days will help insure healthy turkey stocks come spring.

N.C. WILD STORE

Summer Survival Kit

A comfortable T-shirt, a hat to keep you cool, a good video or book, and you're ready to face these sweltering summer days. Just select your summer survival kit and use the easy-order form in the back of the catalog. Oh, and bring your own hammock.

Our white, 100% preshrunk cotton T-shirts (Beefy T®) are guaranteed for durability and comfort. Three cap styles and color combinations give every cap fancier a choice.

N.C. WILD T-SHIRT

Pocketless tee has N.C. WILD logo on the front and features a colorful original design on the back. **$14.50.**

ITEM CODES **A4MED** (medium), **A4LRG** (large), **A4XLG** (extra large), **A4XXL** (extra extra large)

WILDLIFE IN N.C. T-SHIRT

Pocket tee has magazine logo on a front pocket and features tundra swan design on the back. **$14.50.**

ITEM CODES **A5MED** (medium), **A5LRG** (large), **A5XLG** (extra large), **A5XXL** (extra extra large)

N.C. WILD CAP

N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. **$16.50.**

ITEM CODE **A1**

WILDLIFE IN N.C. CAP

Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with a leather strap and metal closure. Two-tone cap is navy/ stone. **$16.50.**

ITEM CODE **A2**

WILDLIFE IN N.C. CAP

Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. **$16.50.**

ITEM CODE **A3**

ALL THINGS ARE CONNECTED

Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. (See page 40 for accompanying teacher's guide.) **$20.**

ITEM CODE **W1**

DOGS THAT POINT, FISH THAT BITE

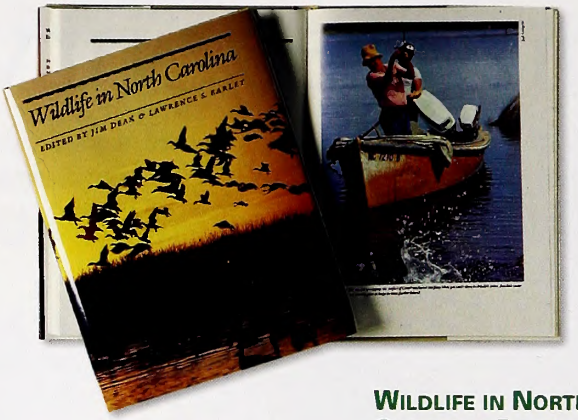
Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. **$19.95.**

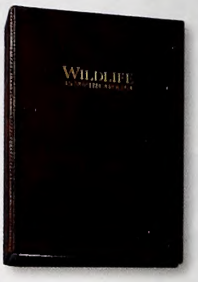
ITEM CODE **M8**

More terrific items ☛

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE

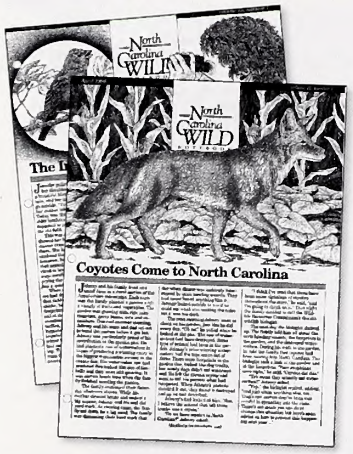




WILDLIFE IN NORTH CAROLINA MAGAZINE BINDER

Store 12 issues of the magazine in this sturdy binder. $10.

ITEM CODE **M2**



N.C. WILD NOTEBOOK 1995-1996

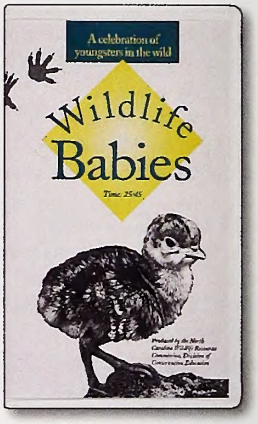
Eight issues of *North Carolina WILD Notebook*, the Wildlife Commission's prize-winning conservation-education newsletter. $3.

ITEM CODE **E11**

WILDLIFE IN NORTH CAROLINA BOOK

The best of *Wildlife in North Carolina* magazine. $12.

ITEM CODE **M3**



WILDLIFE BABIES

Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20.

ITEM CODE **N9**

Value Buy! Buy the set and save.

LIZARDS OF N.C.

Shows all 12 of the state's lizard species. 22" x 34". $6.

ITEM CODE **P3**

TURTLES OF N.C.

Shows all 21 of the state's turtle species. 22" x 34". $6.

ITEM CODE **P4**

SNAKES OF N.C. (LIVEBEARERS)

Shows all 17 of the state's livebearing snake species. 22" x 34". $6.

ITEM CODE **P5**

SNAKES OF N.C. (EGGLAYERS)

Shows all 19 of the state's egg-laying snake species. 22" x 34". $6.

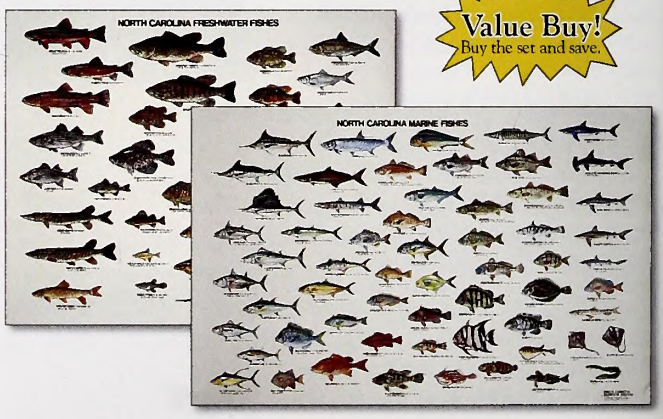
ITEM CODE **P8**

SET OF 4 POSTERS

You'll save $6 by purchasing the set of four posters above. $18.

ITEM CODE **P10**

Value Buy! Buy the set and save.



N.C. FRESHWATER FISHES

Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6.

ITEM CODE **P6**

N.C. MARINE FISHES

All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6.

ITEM CODE **P7**

N.C. FRESHWATER FISHES AND N.C. MARINE FISHES

Save $2 when you buy both posters as a set. $10.

ITEM CODE **P9**

North Carolina WILD Places Map

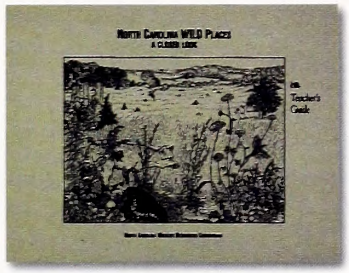
Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4

North Carolina WILD Journal

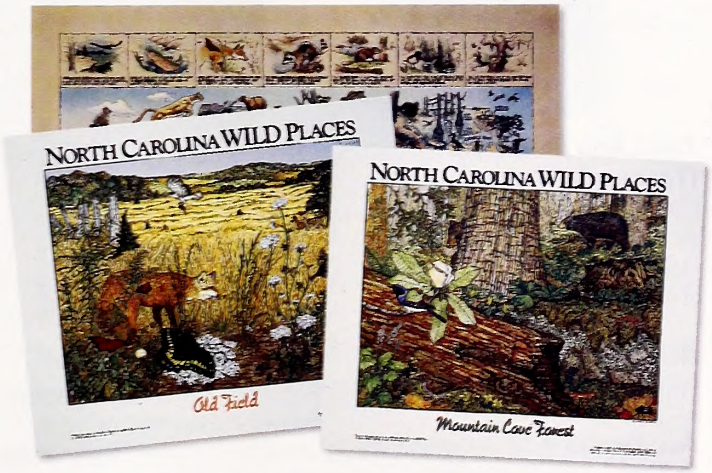
Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7



Value Buy!
Buy the set and save.



North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places book and posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16.
ITEM CODE E6

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look*. 19 1/2" x 16". Shipped folded with poster version of WILD Places Map. $8.
ITEM CODE E5

Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.

Cub & Boy Scout Correlation.
ITEM CODE E9

Girl Scout Correlation.
ITEM CODE E10

Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.

This Land Is Sacred (Teacher's Guide)

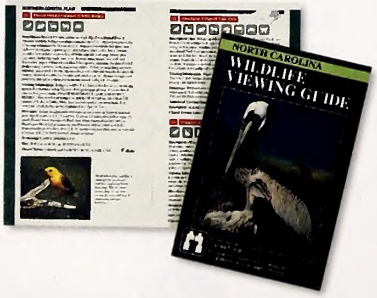
Classroom activities to accompany the All Things Are Connected video. $4.50.
ITEM CODE **W2**

All Things Are Connected

(Video sold separately on page 37.)

All Things Are Connected & This Land Is Sacred

Video and Teacher's Guide package. $22.
ITEM CODE **W3**

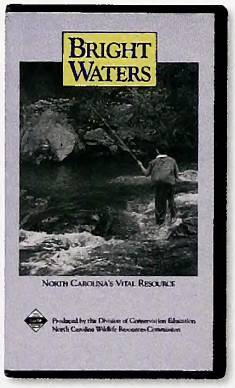


North Carolina Wildlife Viewing Guide

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95.
ITEM CODE **N6**

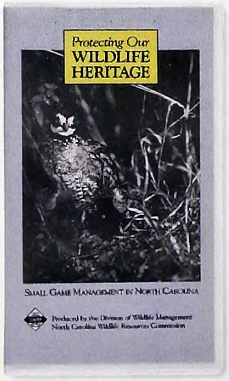
Gardens for Butterflies

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2.
ITEM CODE **M5**



Bright Waters (Video)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20.
ITEM CODE **N7**



Protecting Our Wildlife Heritage (Video)

25-minute video offers useful tips for landowners on managing small game. $20.
ITEM CODE **N8**

WILDlife Profiles

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. $2 ea.

WILDlife Profiles Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard.
ITEM CODE **W4**

WILDlife Profiles Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar.
ITEM CODE **W5**

WILDlife Profiles Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, large-mouth bass, black crappie, channel bass. ITEM CODE **W6**

WILDlife Profiles Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon. ITEM CODE **W7**

WILDlife Profiles Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE **W8**

WILDlife Profiles Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE **W9**

WILDlife Profiles Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab. ITEM CODE **W10**

WILDlife Profiles Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE **W11**

WILDlife Profiles Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE **W12**

WILDlife Profiles Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE **W13**

WILDlife Profiles Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE **W14** NEW

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (_____) _____-_____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State ____ Zip _____-_____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

➜ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
➜ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
➜ (N.C. residents add 6% sales tax.) ..... **TAX**	$
➜ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
➜ (Add all items above.) ..... **TOTAL**	$

For credit card orders, provide information below.

CREDIT CARD NUMBER

EXP. DATE

( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

- ☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
- ☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

- ☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
- ☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
- ☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
- ☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

- ☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
- ☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
- ☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
- ☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (___) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

_____ _____ _____ _____ _____ _____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

The 1998 North Carolina Wildlife Calendar Is Here.

Robert Flowers' painting of "Winter Maidens" is a sample of the fine art featured in the 1998 North Carolina Wildlife Calendar. To order your calendar, see the convenient order form on page 35.

"Winter Maidens"
Robert Flowers

courtesy of Anne Lynch

1998 October

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
September S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	November S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Fishing Days Best Good Fair Poor Moon Phases ● New ☾ Last Quarter ○ Full ☽ First Quarter	"Report Wildlife Violations" Call Toll-free 1-800-662-7137	1	2 A lifetime license—one of the keys to a successful hunt	3
4 • Fall bluefish hit in surf	5 ○	6	7	8 • Fall channel bass run begins • Sea duck migration peaks	9	10 • Peak bass fishing at Kerr, Gaston lakes
11 • Hummingbirds begin migration to South America	12 • Canada geese from north arrive *Columbus Day* ☾	13	14	15	16	17
18 • Fall foliage peaks in Mountains	19 • First fall frost in Piedmont	20 • Fall crappie fishing peaks	21	22 • Acorns mature	23	24

Buck in the Open

It isn't all that common to see a nice buck standing out in a field in broad daylight. Given the 8-point rack, you'd assume that this whitetail is old enough to know better. Then again, he may not be very old—teeth, not antlers, are more reliable indicators of age. To learn why it's so important for wildlife biologists to know the age of deer, turn to page 22.

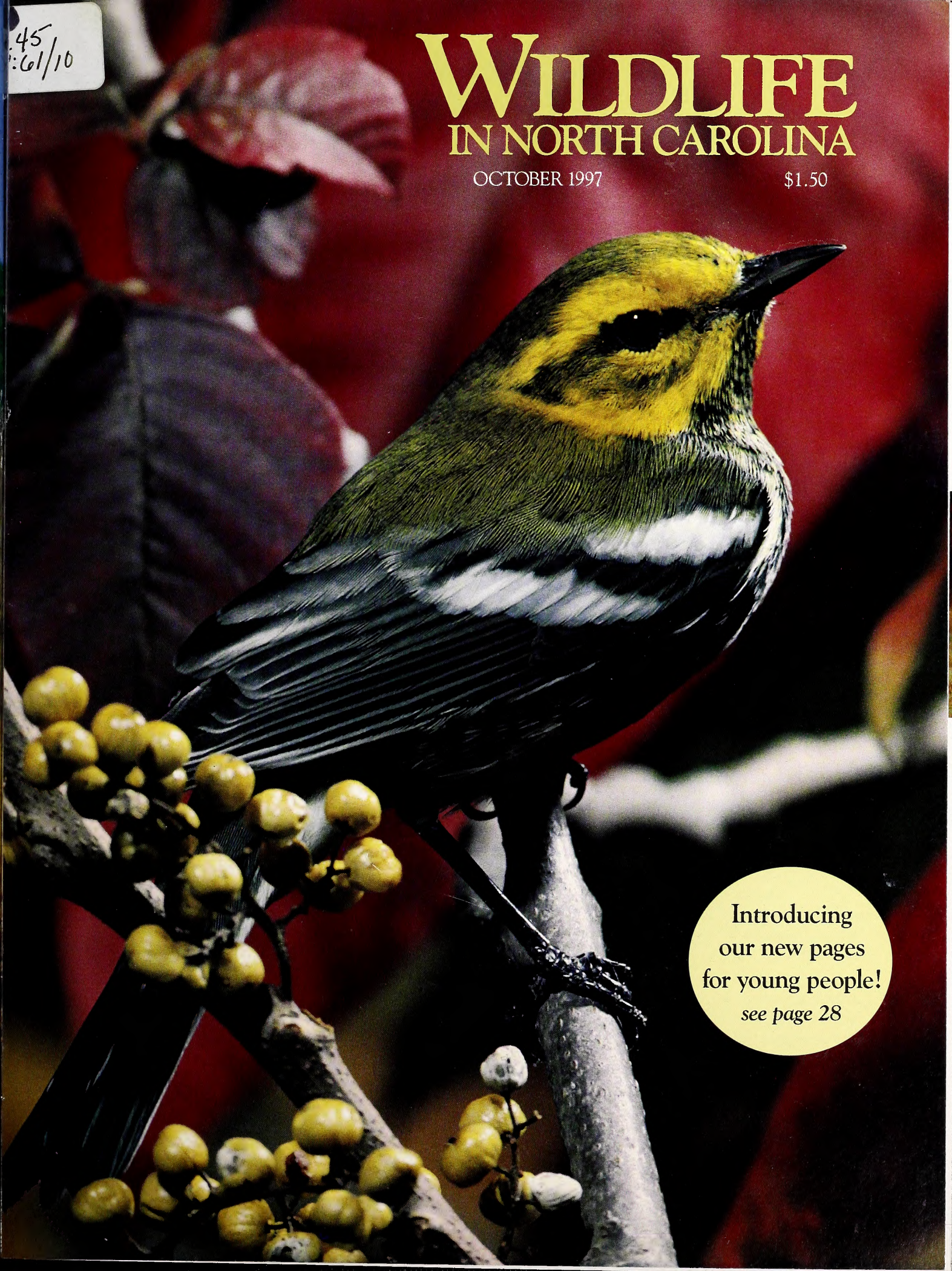
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

45
:61/10

WILDLIFE IN NORTH CAROLINA

OCTOBER 1997 $1.50

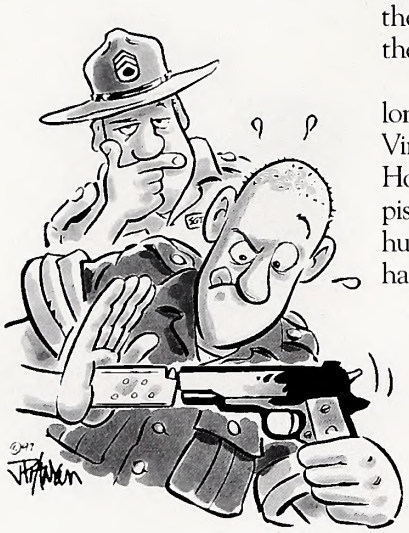


Introducing our new pages for young people!

see page 28

Bullets Facing Forward

by Jim Dean



ILLUSTRATED BY JACKIE PITTMAN © 1997

The very notion that I might attempt to help someone become a better rifle and pistol shot will be a source of entertainment in some circles. Friends who have witnessed my skill with a shotgun will be especially amused. Yet, I need not point out that we are buffeted on all fronts these days by "experts" who speak authoritatively, and at length, on all manner of subjects that they have not personally mastered, or even attempted. It is the signature of the '90s.

That said, I must confess that I am, indeed, a poor shot with a scattergun. Furthermore, I no longer shoot very often or particularly well with a rifle or pistol. Ah, but there was a time. At the Virginia Military Institute in the early 1960s, and later at forts Knox, Benjamin Harrison and Holabird, the Army took a keen interest in teaching young officers the rudiments of rifle and pistol shooting. Those of us who had spent our early years wearing out air rifles on tin cans, and hunting squirrels with .22 single-shots were quick learners, while those with urban backgrounds had to overcome an irrational fear of firearms and start from scratch.

I recall a grizzled old sergeant who was patiently showing a group how to load the magazine of a .45-caliber semi-automatic service pistol. One raw second lieutenant was having trouble getting the bullets to go into the magazine so the sergeant paused to help him. Returning to his podium, the sergeant sarcastically amended his instruction with the air of one who had witnessed a new level of incompetence. "Bullets face forward, gentlemen," he said dryly.

But that sergeant, and countless other unflappable range officers, taught us how to shoot a variety of weapons, particularly the M-1 Garand rifle and the standard issue .45 sidearm. Most of us eventually became acceptably proficient, and some excelled. Many of us never forgot those basic skills and later, as civilians, we found them as valuable in hunting game or target shooting as they would have been in battle.

"That sergeant, and countless other unflappable range officers, taught us how to shoot."

Even if you've had the advantage of military instruction, you would surely find it helpful to take a refresher course to reacquaint yourself with sound shooting techniques. I suspect, for example, that modern big game hunters would be particularly well served to learn how to use stable positions and a rifle sling to steady their shots. That's too big a subject to address here, but there are two other bits of information that could greatly improve your shooting this season. The first tactic will help you gain a steady sight picture and a smooth release with rifle or pistol, with or without a scope.

Many shooters don't know how to settle down and make a telling shot—they rush the process while their adrenaline is pumping, jerk the trigger, flinch and wonder why they scatter bullets all over the target and beyond.

My old military instructors had the answer. They told us to remember the acronym BRASS which stood for Breathe, Relax, Aim, Squeeze, Shoot. Once we were in our stance and ready to shoot, they advised us to carefully think about, and follow, the same sequence with every shot. First, take a moderate breath and let out half of it. Second, make a determined effort to relax, and only then begin to concentrate on lining up the sights. When you're satisfied you're on target, begin to slowly squeeze the trigger.

"If you're doing this correctly, you will not know precisely when the gun will fire," we were told. "The last step—Shoot—is the only step in the sequence that is not predetermined. If you don't consciously try to make the gun shoot, you are less likely to jerk or flinch."

It works. Try it on the target range until the sequence becomes second nature. Naturally, it works best on stationary targets, but once you've made the process a rapid habit, it will aid all your shots, even at moving game.

There's another military tip that I've found particularly helpful, especially with open sights. When you're lining up rear and front sights, there's a tendency to focus your vision on the target. Big mistake. The key is to focus on the sights making sure both are aligned properly, while blurring the target beyond. If your sight picture is lined up correctly, your chances of making a good shot are excellent even if you're having trouble holding rock steady. Proper focus and alignment will occur instantaneously and habitually with practice, and it does not mean that you can't see or identify your target.

Now, go forth and shoot safely and well. And remember: bullets forward.

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment,
Health, and Natural Resources

Wayne McDevitt/Secretary

North Carolina Wildlife Resources Commission

Jim Bennett/Chairman/Greensboro
John E. Pechmann/Vice-Chairman/Fayetteville
C. J. Belch Jr./Roper
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
John Coley/Holly Springs
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John F. Lentz/Ellerbe
Joe Long/Mocksville
Charles R. Preston/Conover
Eugene Price/Goldsboro
Wes Seegars/Goldsboro
Bobby N. Setzer/Cullowhee
W. Ray White/Manteo
Arthur J. Williams, III/Washington

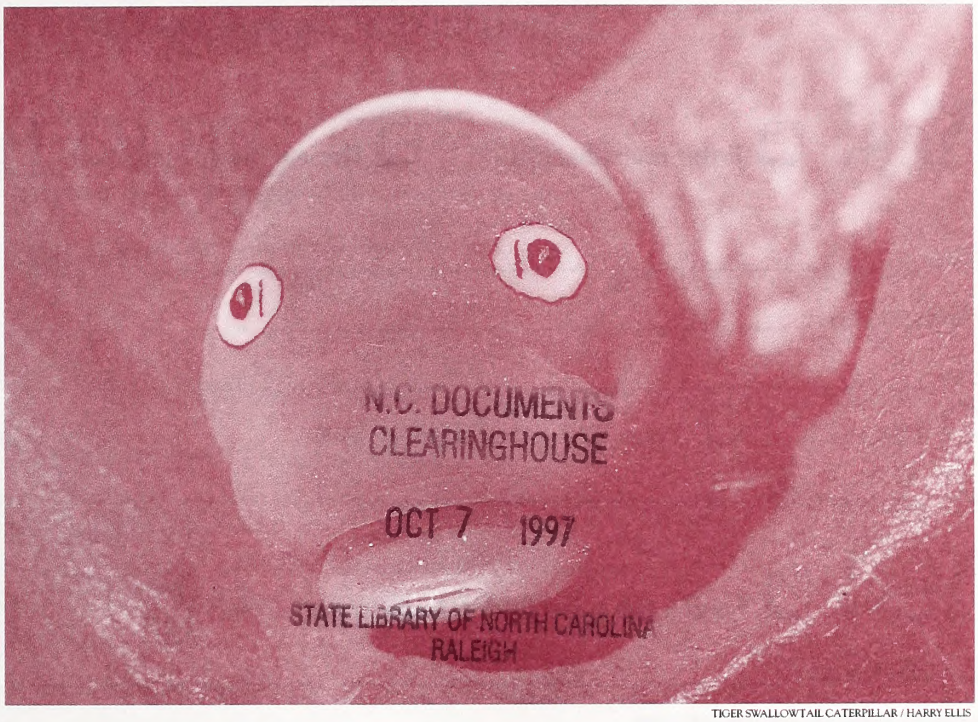
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education
Gordon S. Myers/Engineering Services

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Kimberly K.C. Schott/Interim Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants


N.C. DOCUMENTS
CLEARINGHOUSE
OCT 7 1997
STATE LIBRARY OF NORTH CAROLINA
RALEIGH

TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, there's a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS

MAGAZINE SUBSCRIPTION ORDER FORM

FW97-98

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.**
(If renewal, attach recent magazine label.)

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___) ___-____
first name MI last name area code

Mailing Address _____

City _____ State ___ Zip _____-____

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** $

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription From _____
first name MI last name
Mailing Address _____
City _____ State ___ Zip _____

Gift Subscription To _____
first name MI last name
Mailing Address _____
City _____ State ___ Zip _____-____

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name
Mailing Address _____
City _____ State ___ Zip _____-____

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** $

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** $

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE ( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

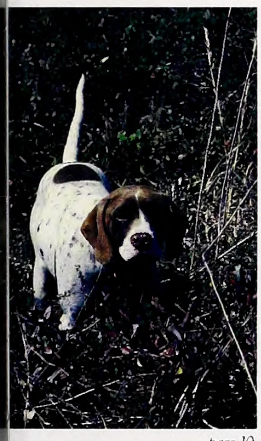
Contents

Wildlife in North Carolina

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

October 1997 *Volume 61, Number 10*

Features



page 10

4 **Joyce Kilmer's Birds: New Thoughts on an Ancient Forest** *written by David Lee* ©1997
photographed by Steve Maslowski ©1997
I thought I knew exactly what sort of bird life I'd encounter at Joyce Kilmer Memorial Forest until I went there. What I found argues against some long-held beliefs.

10 **Encourage Your Pup to Brilliance**
written and photographed by Mike Gaddis ©1997
Your bird dog puppy can realize its full potential only if you know how to encourage developing traits—and when to leave well enough alone.

14 **Southern to the Core** *written by Ted Dossett*
photographed by Melissa McGaw
In Chatham County, Creighton Lee Calhoun Jr. is preserving historic varieties of apples, some that may have been lost without his help.

20 **Solving 10 Tough Deer Problems**
written and photographed by Gerald Almy ©1997
Do these problems sound frustratingly familiar? Here's how to cope.

24 **Hickory Milk and Yaupon Tea**
written and photographed by Burt Kornegay ©1997
Spread it, drink it. Get a taste of history, and of the flavors prized by Native Americans before the first settlers arrived here.

page 20

page 14

Departments

Our Natural Heritage *by Jim Dean* ..... **inside cover**
Nature's Ways *by Lawrence S. Earley* 2
N.C. WILD Notebook *by Consie Powell* 28
Back Porch *by Rodney Foushee* 32
Wildlife Through the Year *by Rodney Foushee* 36

Young people's pages!

Cover *The black-throated green warbler is part of Joyce Kilmer's myriad birdlife. Photographed by Steve Maslowski.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

Being Amphibian

written by Lawrence S. Earley
illustrated by David Williams

The amphibious life style is a popular one, especially among the amphibians—the frogs and salamanders. Most frogs and salamanders spend many months of each year as terrestrial creatures, and then move into ponds and other aquatic habitats to mate and lay their eggs. After egg-laying, the adults move back to land again.

Biologists consider this pattern to be the original or ancestral one, but other amphibians have departed from it. For example, some woodland salamanders have taken up an entirely terrestrial life. These include such species as Jordan's salamander and the redback salamander. These salamanders live their lives on land and lay their eggs in moist places on land, too. Indeed, their larvae undergo metamorphosis—the physical change from larval to juvenile forms—within the egg and hatch as fully formed terrestrial juveniles.

Other salamanders spend their whole lives in water, never emerging on dry land. To carry on this aquatic existence, they retain some of the characteristics possessed by most amphibian larvae—gills, a swimming fin and absence of eyelids. This trait of holding onto larval characteristics into adulthood is known as *neoteny*. Salamanders that exhibit this behavior include four families containing some of the largest and most bizarre-looking of all salamanders.

Amphiumidae. The amphiuma family boasts the the largest of all North Carolina salamanders—the two-toed amphiuma (*Amphiuma means*). It can grow nearly 4 feet in length, looking very much like an eel, except for four tiny, almost negligible, legs, each terminating in two-toed feet. It does not have external gills.

Sirenidae. The siren family includes two species in North Carolina, including the greater siren (*Siren lacertina*) which may grow nearly as long as the amphiuma. It has external gills and two front legs with four toes on each.

Cryptobranchidae. The hellbender—growing to about 28 inches in length—is the single North Carolina species in this family.

Proteidae. This is the mudpuppy family, whose members are also known as waterdogs. Of the three mudpuppy species in North Carolina, the Neuse River waterdog (*Necturus lewisi*) is perhaps the most interesting. Like all mudpuppies, it has four short legs with four toes on all feet. The adults are colored a rusty-brown and they have large, dark spots. Their gills are feathery and flare out when the mudpuppies are being aggressive. When the female lays her eggs (about 35 of them), she attends them until they are hatched.

The Neuse River waterdog is found nowhere else but in the upper Neuse and Tar river drainages. Endemisms are not unusual in North Carolina, but these two rivers seem to be particularly rich in endemic fauna. Aside from the mudpuppy, other endemic species found there include a fish (the Carolina madtom), a mussel (the Tar spiny mussel) and a few crayfish species.

Why have the amphiuma, siren and mudpuppy family members relied on an entirely aquatic way of life? Does this life style convey any advantage or does it entail some risk?

To answer these questions, let's compare them to salamanders that are truly *amphibious*. For them, the aquatic stage is necessary mostly for the well-being of the eggs, which are enclosed in a jelly coating that swells on contact with water and protects the eggs. But for larvae that hatch from these eggs, there are some risks. The physical changes involved in metamorphosis can themselves be hazardous, and the salamander is vulnerable to predators while it is undergoing these profound changes.

Thus, "staying larval" can be a wise strategy for a salamander like the mudpuppy. How wise it is can be measured by the length of time—about six years!—needed by the Neuse River waterdog to grow from egg to adult. That's an extraordinarily long period of immaturity, suggesting that their habitats are generally safe and stable and that there's no particular risk, and some advantage, to delaying their reproductive stage.

Indeed, the mudpuppy's populations apparently have not been threatened by this strategy, despite its status as a species of Special Concern. One reason for this listing is the poor water quality in its environment, which is a problem for which we all share some responsibility.

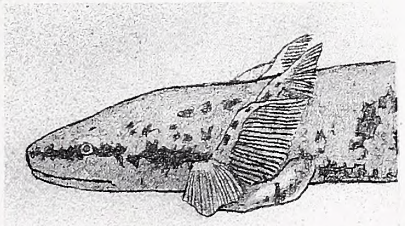
Other Reading

- Bernard S. Martof et al., *Amphibians and Reptiles of the Carolinas and Virginia* (University of North Carolina Press, 1980).
- Robert C. Stebbins and Nathan W. Cohen, *A Natural History of Amphibians* (Princeton University Press, 1995).

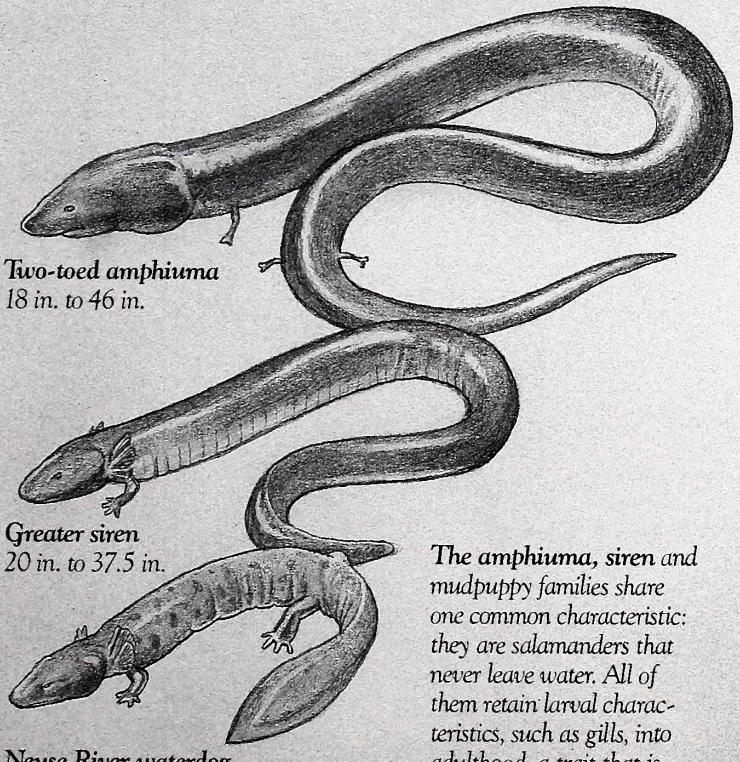
Surfing the Web

- For information on how mudpuppies differ from the Mexican axolotl, look at this site from the Univ. of California at Irvine. *Address*: http://darwin.bio.uci.edu/~mrjc/mudpuppy.html
- For the Biodiversity and Biological Collections Web Server, which provides links to those interested in amphibians and reptiles. *Address*: http://muse.bio.cornell.edu/
- For a basic page on amphibians from the St. Louis Science Center. *Address*: http://www.slsc.org/docs/mod3/mod3_2/mod3_22/ep2936g.htm

The Neuse River waterdog (Necturus lewisi) *is one of only a few salamander species that never leaves water. It lays its eggs in the Neuse and Tar river drainages, and the adults live an entirely aquatic life.*



The mudpuppy, *which is an aquatic salamander, keeps its fluffy gills into adulthood.*



Two-toed amphiuma
18 in. to 46 in.

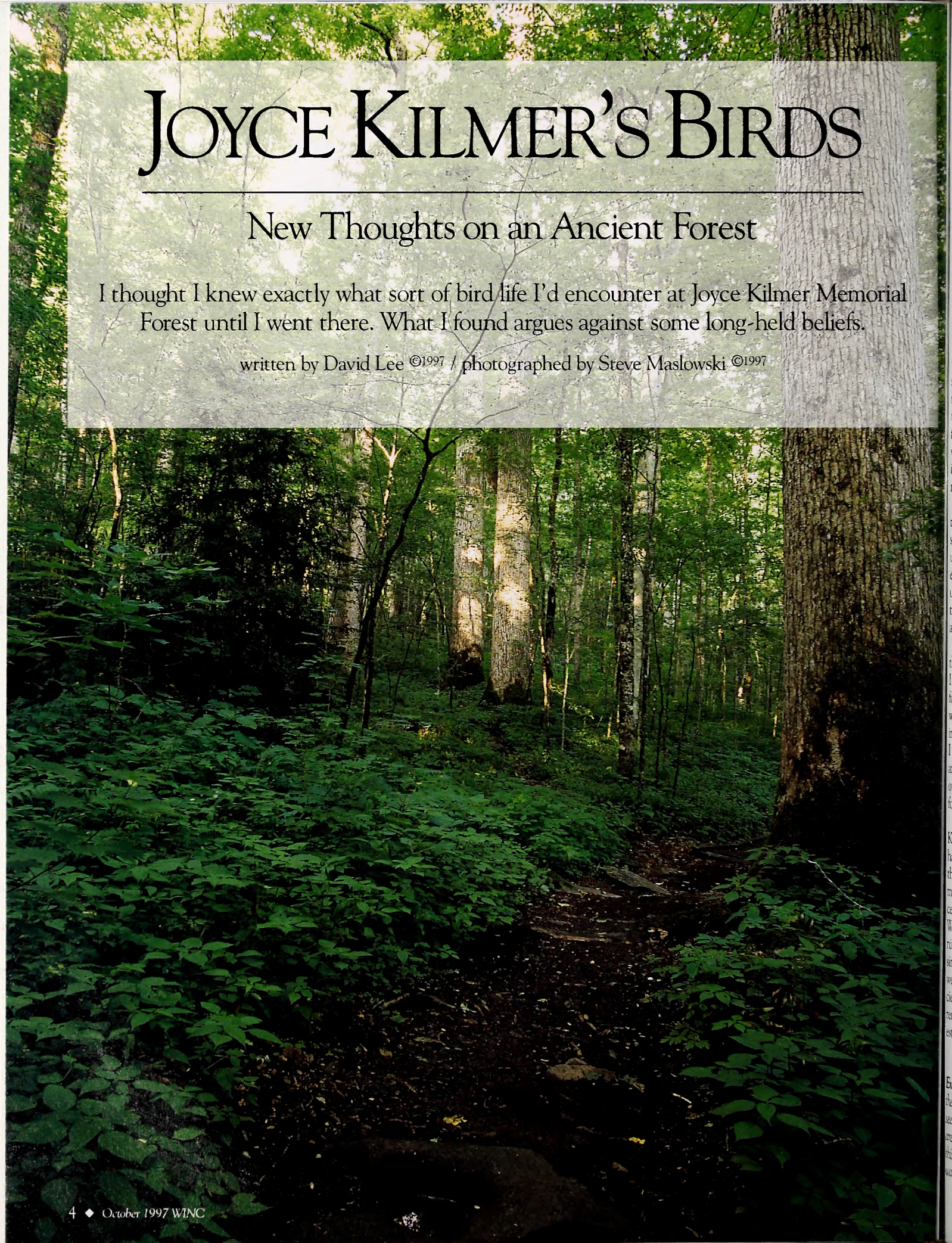
Greater siren
20 in. to 37.5 in.

Neuse River waterdog
6.5 in. to 11 in.

The amphiuma, siren *and mudpuppy families share one common characteristic: they are salamanders that never leave water. All of them retain larval characteristics, such as gills, into adulthood, a trait that is known as* neoteny.

Illustration after Dundee & Rossman, *The Amphibians and Reptiles of Louisiana* (LSU Press, 1989).

The Neuse River waterdog *has a very restricted range. It is endemic to the Neuse and Tar river drainages.*



JOYCE KILMER'S BIRDS

New Thoughts on an Ancient Forest

I thought I knew exactly what sort of bird life I'd encounter at Joyce Kilmer Memorial Forest until I went there. What I found argues against some long-held beliefs.

written by David Lee ©1997 / photographed by Steve Maslowski ©1997

I had heard several singing water thrushes, but only after crossing the bridge and climbing the trail far enough to escape the sound of the creek did I begin to hear the voices of other birds. The loud call notes of an Acadian flycatcher, two Blackburnian warblers singing their high-pitched, buzzy songs, one titmouse, four black-throated green warblers, two hooded warblers—one calling from each side of the trail, another black-throated green warbler—and so it went. I slowly walked the 2-mile length of trail in the Joyce Kilmer Memorial Forest recording in my field notebook every individual bird encountered within 75 yards on either side of me. It took over two hours to finish a walk most people complete in half that time. I tallied 165 individual birds representing 34 species. At the time I thought that both numbers seemed quite high when compared to similar bird surveys I had done in other forests. The results of my first day's field work for a planned systematic study looked interesting, but before I get too far along, let me explain all this from the beginning.

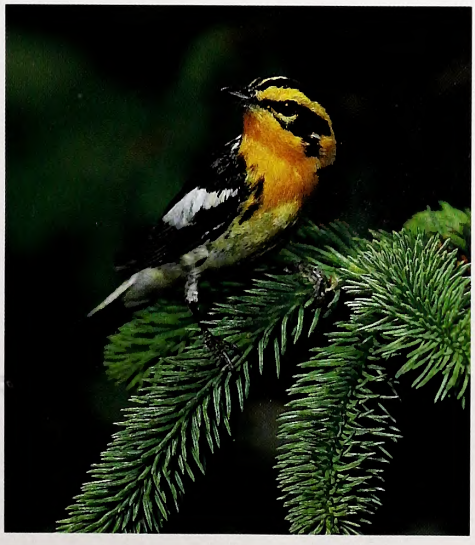
On occasion, usually just during weak moments, I think that somehow I should in some way try to put my academic training to use. This education taught not just specifics, examples that we are led to believe have underlying purpose, but also concepts and theories. As biologists, we have a duty to test and fine-tune these basics.

So it came to pass that while investigating the bird life of Joyce Kilmer Memorial Forest, I was not simply making a bird list of the forest. I was starting a research project that would test basic concepts against my findings. With new computer graphics packages, I could demonstrate a few astute thoughts and publish my results in one of any number of respected, peer-reviewed journals. My former professors would be proud.

The drive from Raleigh to the Joyce Kilmer Memorial Forest is a long one, and I had over five hours to think about testing the particular biological concepts I had in mind—a neat deal, testing a test. The concepts were relatively simple and interrelated. When temperate plant and animal communities mature, they become stable and rather simplistic. The dominant species do very well, so well, in fact, that competitive species become crowded out, while the few that remain become abundant. In a mature forest such as Joyce Kilmer, the community, in theory, stabilizes for perpetuity. Ecologists call this a climax forest, the last forest type in a sequence of woodlands. At any given site it takes hundreds of years to achieve the final product—forest equilibrium.

In changing forest systems, by contrast, where any number of species are competing for resources, the plant and animal community is quite diversified. There are colonizing species, species that characterize intermediate conditions, and any number of plants and animals that flourished at the site years or decades before, but for which the conditions are no longer quite right. Yet a few of these from times past manage to hang on. In such places there is a large variety of species, but the actual numbers of any particular kind are quite small. So, though I had never been there, I believed the bird life of Joyce Kilmer would be entirely predictable. I knew I would be documenting only a few kinds of birds, only species that prosper in mature, old-growth forest. The few types found here, however, would do very well for themselves. Without other competitive species, the few that could make a living would flourish in extremely high numbers. As diversity decreases, the density of the remaining species increases. That was the concept, and to underline my points, I could study adjacent forests that had been logged more recently. This was going to be great. We need more cheerleaders for the scientific method.

Except for the distance from Raleigh, the Joyce Kilmer Memorial Forest is the perfect place to focus my study. It is a virgin forest. Not only is it the only virgin forest in North Carolina, it is one of the few—and the largest—untouched stands in eastern North America. It exceeds 3,800 acres and sits within an old-growth wilderness area of over 14,000 acres. The trail system would be perfect for my bird transects; there is nothing more counter-productive than hacking through rhododendron thicket while trying to listen for birds that you are scaring away. In fact, I was surprised that the birds of this forest had not already been studied.



***Even if you stick** to well-worn paths, there is a good chance to hear—if not see—some of the many bird species that are attracted to various niches within this climax forest. The blackburnian warbler (right) is a colorful visitor.*

In case you missed it, the forest was named for Joyce Kilmer. He is regarded as a poet but was actually a widely read New York journalist. He was killed in World War I at the age of 32, and he actually wrote only a few poems. You can read his most famous poem on the brass plaque at the beginning of the loop trail that winds through the forest. The poem is one you all know—"Trees." It the one that starts, "I think that I shall never see..." Remember standing around in second grade with arms stretched out pretending to be a tree? While Miss Escorn read the poem (several times over; it was short, and a dull second grader might not get the full message on one reading), you had to be careful that your branches did not touch those of Linda Jane. And you could not show any emotion (something I personally have never had a problem with when people are reading poetry). Miss Escorn could make you stand like a tree for a long time if she thought you were cutting up in class. I have never liked that poem, and I would not choose it as the prime public relations agent for woody vegetation.

Even so, anyone who takes the time to walk the trail in the Joyce Kilmer Memorial Forest will be enchanted by the trees. The larger ones are hundreds of years old, and many of the big tulip poplars measure over 20 feet around the base. The older trees tower 100 feet or more, and a few exceed 150 feet. Yet, it is the forest in its totality that gets to you. This is unlike any other woodland you will ever encounter. On one visit last summer I found a comfortable place beside the trail and sat and watched people. There were retired couples, families with children, families with lots of children, big, strong blue-collar guys with tattoos, and any number of people for whom I could tell by their dress, or because of their huffing and puffing, that a walk in the woods was not something they did on a regular basis. All were captivated by the cathedral-like atmosphere. Midsized children, who had been acting like hellions minutes before in the parking lot, were gawking in silence. People whispered; most said nothing. There are no signs restricting voice levels or outlining proper woodland behavior, but still the people whispered and walked quietly. And no one was in a hurry. Silent children pointed. And the most amazing thing is all the little unplanned side paths made over time to and around each of the giant trees. People are compelled to visit with the trees. Maybe we capture something from other living beings that have stood in exactly the same place since at least the early 1700s.

***From the ground** high into the upper canopies of the forest, birds find and inhabit their special niches. Some prefer the very top, some stick to dense, low cover while others thrive best in the open understory or in sunny spots opened by natural events. Diverse species found here include the tufted titmouse (far left), brown winter wren (near left), black-throated blue warbler (top) and brown creeper (top, below).*

The only thing vocal in the forest was the birds—buzzy warblers and calling tanagers. Did their songs and calls take on a richer quality in this forest? Hearing the song of a winter wren was surprising, and it reminded me of my mission. To me this was a bird that, in the South, was characteristic of, and restricted to, the spruce-fir forests of high elevations. This wren was entirely out of context here. Its song is an extended, complex musical score that, when reproduced on a sonogram, is longer than the bird itself. You are much more likely to hear a winter wren than to see one. They live in dense stands of ferns and other thick cover, where they run about like mice. I know they can fly, but I have never caught one in the act. In fact, if you are going to inventory the birds of Joyce Kilmer you'd better know their songs. On a one- or two-hour walk through the forest it is unlikely that you will actually see more than three to five birds. Most of the ones I found were identified by song alone. In places the vegetation is thick, and even the species that live in the midcanopy are often 70 feet or more above you. And which vireo was that? It was too high up to see, and I am forever getting their songs confused.

I actually started this study in 1987 and for a number of reasons never completed it. The distance often prevented me from visiting the forest as frequently as I wanted, but mostly I think I simply needed time to digest the information I was getting. On other trips the results were always similar to the first, and they never came out the way they should. I kept finding both a high diversity *and* a number of species with high densities. In fact, I continued to add additional species that I had previously overlooked. The common species, of course, were encountered on every trip, but the ones that were less prevalent were often overlooked.

On my last visit I added a courting male turkey and several drumming ruffed grouse. As hunters will attest, these birds are secretive, and I found them well away from the loop trail. I would have missed them this last time, too, if it had not been for their elevated hormones. My total list now stands at 43 breeding species; 30 of these were common enough that I encountered them on almost every visit. This is high. The total bird list for the Unicois, a modest-sized mountain range shared by North Carolina and Tennessee that backs up to this forest, is 45 species. In Joyce Kilmer, warblers alone accounted for 12 species and about 70 percent of the total number of individual birds. The rarest bird I found was an olive-sided flycatcher. I saw him only once, singing from a dead snag next to a large canopy gap. This flycatcher formerly bred in the southern Appalachians, but in recent years it has not been heard or seen. The one I saw was the only one found in the state during the breeding season in the last several decades.

One of my real surprises was finding a number of breeding birds that, like the winter wren, are confined to middle and high elevations elsewhere in the southern Appalachians. Not only were there a number of species in this category, but several of them had relatively high densities here. The elevation in Joyce Kilmer at the start of the trail is just about 2,240 feet, yet some of the birds I was finding are typically at 4,000 to 6,000 feet elsewhere in the Southeast, and while some occur lower, they do so only rarely. Even then, seldom do you see them in numbers at sites that are lower than 3,500 feet. These birds collectively used a number of microhabitats in the forest. Juncos, golden-crowned kinglets, brown creepers, saw-whet owls, and Canada, black-throated blue and Blackburnian warblers each represented low-elevation records. I conclude from this that, prior to logging, these species were not restricted to the tops of sky islands as they are today. In the southern Appalachians they were probably found in any number of forest types, and by occurring as low as 2,000 feet they tell us that they were not always restricted to isolated relict populations but formerly occurred throughout the entire mountain chain.

Another reason I never completed my study was that this forest was so different that I had nothing from my experience, or from text, for comparison. To my total surprise, a longtime friend who had previously worked with me on various aspects of my seabird research had become interested in old-growth forests. Chris Haney, now a wildlife ecologist for the Wilderness Society, was investigating the attributes of old growth in a forest in Pennsylvania. During the course of several phone conversations it became clear that not only were his observations similar to mine, the list of birds he had for his forest was nearly identical to what I had found in Joyce Kilmer. Direct analysis, however, was not possible because he had censused the actual density, while I had concentrated on ranking the relative abundance of species. However, much of the information we independently collected could be compared.

During a weeklong visit Chris and I, along with two hardworking students, mapped out the territories of 208 individual birds in Joyce Kilmer to obtain figures that we could use to statistically interpret our results. For the most part, what we independently found was so similar that the information could have been obtained in either forest.

The birds obviously take advantage of the diversity of microhabitats in these woodlands and consequently display themselves in both numbers and variety. Not only did we find the number of species to be high (twice as many as would be expected in younger, yet mature, forests), but the number of individuals of some species was much higher than what is found in younger forests. The overall number of birds per unit of space—the total density of all species—was high, too. There were around 300 territorial pairs for every 100 acres of forest. This is 35 to 50 percent higher than what is found in similar, but younger, stands.

In the end, I ask myself what all this means. One point is clear: ancient forests support very complex bird communities. A number of species that we currently

consider to be uncommon, or at least to have very restricted local distributions in North Carolina, do quite well in these forests. On the other hand, many of the species we regard as abundant in North Carolina don't use ancient-growth forest at all. This has made me readjust my thinking on the current order and organization of the "natural" world. We tend to think of what was around when we were growing up as normal—subsequent change is what we fight to prevent. I had to face the fact that even before I was a teenager, the forests of the southeastern United States had been fragmented, cut, and had partly regrown at least two to three times. Most importantly, these ancient forests are extremely important for birds, or at least would be if we had more of them. If land planners agree that they are important, too, we can have more ancient growth, but the wait will be considerable. Maybe someday people will view forests not in terms of board feet but in the densities of Blackburnian warblers, or golden-crowned kinglets per acre. Not today, not next year, but someday.

What does it mean in terms of academics? I am not sure that we have it all sorted out yet. I was involved in another research project in which I was looking at the historical and current distributions of birds in North Carolina. The results will surprise some. Of the over 220 breeding species known from the state, about 90 of them had significantly increased their distributions during the last 100 years. Of these, at least 35 species that nest in the state today did not do so 100 years ago. Only 10 species actually exhibited declining distributions during the same time period, while several had increased and subsequently decreased. Only about 88 had stable distributions for which I could document no overall change in the last hundred years.

This does not directly relate to overall concerns for local conservation issues, since this study addressed only geographic distribution. The birds that showed the most dramatic increases in the amount of real estate they occupied were birds that benefit from our modification of the land. Birds of fields and hedgerows, species fixated with early-growth forests, and swallows that have learned to stick nests on concrete bridge abutments are all increasing. What was amazing was that this list of expanding species made up such a large percentage of our state's fauna. However, when I compared this study to the list of the birds of the Joyce Kilmer forest, two facts stood out. First, none of the species on the expanding distribution list even lived in this forest. Second, the birds of this forest were all ones that, as best we could tell, had not significantly altered their geographic distributions in the Southeast in the last hundred years. We were looking at not just a primeval forest; this was intact, stable fauna. It was a glimpse of what the mid- and low-elevation faunal composition of the southern Appalachians must have been prior to European contact.

Well, that's exciting, but this study was designed as science. So why were my original predictions so far off? The problems were not with the biological concepts—well, not entirely; they were with use of the word "old." In an old, mature forest the bird life

and its density/diversity ratios would have been predictable. This was not an old forest, it was a very old forest. It was ancient. Going into Joyce Kilmer and learning the age of individual trees does little to tell us the age of the forest. The trees were old, but as a forest system Joyce Kilmer Memorial Forest is ancient. The life and death of individual trees no more marks the actual age of the forest than does a turtle tell us the age of a lake. And when we look at the system as a unit, the story takes shape. The definition of "old growth" in terms of current forestry terminology is about 150 years between cutting. Yet the forest does not actually begin to achieve its climax, primeval state until about 275 years. By this time some of the older trees have lived out their lives, while others, perhaps even from the same age class, are still prospering and even growing. If viewed from afar, the canopy of the forest is uneven, with an occasional giant towering 30 to 50 feet above the surrounding trees.

What should be an equilibrium distribution of tree diameters is theoretical, and probably exists only in books. Detailed studies of this forest show that in the last 250 years there have been at least eight natural disturbances, each removing about 10 percent of the overstory. The canopy openings that freed struggling saplings from their suppression occurred at random times clustered around these natural disturbances. The earliest disturbances were in 1770, with the other major clusters being in the early 1800s and 1920s, but there were a number of lesser ones as well.

The significant disturbances were most likely the result of tornadoes or other violent windstorms. We learned, for example, from hurricanes Hugo and Fran that cyclones are quite capable of carrying a good punch well inland. The trees have survived fire, winds, ice storms, major damage from lightning and the crashing blows of fallen neighbors. The survivors are scarred, missing major limbs, and riddled with pockets of rotted wood, hollows and extensive cavities. Numbers of long-dead trees tower into the canopy, their hollow remains standing sometimes for decades. The uneven canopy, missing limbs and scattered dead trees allow filtered light to reach the forest floor. This, in turn, supports a well-developed herb and shrub layer yet still keeps tree seedlings suppressed. In forests that are simply old this does not happen, and the forest floor remains dark, usually barren and gloomy. The primeval forest is really a mosaic of tree age classes, but it is dominated by the big really old trees.

Clearly, while there were a number of important biological concepts explained in this forest, they didn't exactly match my predictions, or what other biologists would expect from studying ecology textbooks. What Chris and I found was a whole order of magnitude more exciting than what I originally had been trying to demonstrate. The entire precolonial eastern deciduous forest biome took on a new look.

Yet, if I set aside all of the textbook terms, statistical explanations of bird densities and my attempts to explain the complex bird community, I am left with one thought. Here in this 3,800-acre forest is a fragment of time, preserved, not in the static, traditional museum sense, but in its entirety. Captured alive! As peculiar as it sounds, the single key element in keeping it the same is change. A fallen tree here or there results in the creation of temporary, different microhabitats, while the birds redistribute themselves accordingly. It is the change itself that allows the forest to remain in a perpetual state of equilibrium, and it is the little, unplanned changes that allow such a surprising variety of birds to make a living simultaneously in this forest. ⊠

***Joyce Kilmer is not** simply an old-growth forest haboring a predictable wildlife population; Kilmer is ancient, and this undisturbed continuity is what has created so many microhabitats and so much diversity. Three quite different birds common here are the saw-whet owl (far left), golden-crowned kinglet (left) and red-breasted nuthatch (right).*

Encourage Your Pup to BRILLIANCE

Your bird dog puppy can realize its full potential only if you know how to encourage developing traits—and when to leave well enough alone.

written and photographed by Mike Gaddis ©1997

It's inescapable. You've got to be a little slow to train a bird dog. Before someone takes offense, we're talking about a habitual blend of thinking before you act and risk taking, a momentary sanity check before jumping off the cliff. The logic is not nearly so peculiar as it may seem. If your ultimate goal is a pointing dog of refined character, with natural instincts not only intact but honed to brilliance, it's essential.

One of my favorite dog training anecdotes, related by Sammy Giddens, a long time quail hunting accomplice, illustrates the notion:

"Now and then, we'd be huntin' back home, and get a call from Nida's Uncle Harold on the CB. Harold had a hospitable habit of loading up a young dog while we were down and prospectin' around on our behalf. We'd be bouncing down some backwoods path to a laid-out field, the radio'd crackle, and he'd come on in that slow eastern Carolina drawl. 'Hey, - ah - got - a - point - over - here.'

"'Over here' might be 10 miles away!' He'd give us directions. That'd take five minutes. Then, we'd take off, and it'd be 15 minutes more 'fore we got there.

"Sure enough, when we did, there'd be a dog standing out there on point, looking like a million dollars. Harold would be sittin' back in his old blue pickup, just watching that pup, five or six cigarette butts on the ground. Enjoyed that more'n anything. We'd get out, fetch the guns, sidle over and shoot the birds, all in due time on the Sampson County clock.

"That dog would be holding those birds all that spell—probably relocated once or twice—and still tight as a banjo fret! Being trained the whole time and not a word spoken. I've ridden with Uncle Harold, seen it happen."

I've laughed with Sammy and Nida over that story more than once. But beneath the mirth I have undying respect for the method.

That's "slow" in a most intelligent way.

The youngster on point is learning to hold and work a covey of wild birds, to maintain contact with it, and to remain staunch as long as it takes for the guns to get up. And it's all being taught with the minimum of human interference, which is the best way possible. He's building confidence every minute he has those birds, taking the necessary risks, learning how far he can go in doing it, and leaving room for a lot of praise on the far end. That's dog training, partner.

I've wondered behind the scenes how many times Harold Britt had to correct his dog and didn't get to make the CB call. Occasionally, no doubt. But two things I'm sure of. The dog knew what was expected, and words were sparse. The pup was on his own rope. And if he made a mistake, there wasn't any role confusion. There was no trouble on anybody's part figuring out who was in the wrong when the pressure valve blew, and discipline required little more than a token reminder.

When a dog is nurtured this way, you're laying the foundation for brilliance, allowing it to become all it can be, permitting your investment to mature, unsheathing a century of selective breeding niceties.

The spectacular in gun dog performance occurs with the fruition of four traits: exceptional genes, ambition, unrelenting self-confidence and "tongue-against-jaw" daring. Well-bred pups come with the genes; the ambition, confidence and daring ultimately *depend on you.*

Unfortunately, a high percentage of young pointing dogs are robbed of their top-end potential, sometimes with the best intentions. Though all bird hunters appreciate exceptional talents in a shooting dog, far too few understand the sequence and patience necessary to instill them. In a heated rush to shoot birds, too many attempt to supplant canine instincts with human intellect, a dismally poor substitution when it comes to flair in finding, handling and pointing game birds.

There are many ways to booger a bird dog. One of the easiest is by living in inane fear that a bird will be flushed outside gun range and invoking "training" methods which have the singular goal of avoiding it. Almost invariably, such methods are insensitive, confusing, overly constraining and overly harsh, and they fail to consider the development rate of an individual pup.

What kind of gunning companion results? A plodding, mechanical canine shell whose ambition has been curtailed to shotgun range, that hunts with a low, inanimate tail, that false points a lot, potters on ground scent, points birds like a spaghetti noodle, is unreliable out of sight, and that you have to steer everywhere a covey of birds might be. Very sad, really.

On the counterside, a pup that's been encouraged to brilliance exudes confidence the minute he's out of the box. He's bold, ambitious, mindful and animate on the ground, reaches to birdy objectives independently because he's been allowed to, finds and handles game with verve and flair, rarely stands unproductively, has spine-tingling

Building rapport and *obedience with a young dog through yard training is the critical first step because it establishes a special loving, trusting bond, and it enhances your dog's natural desire to please.*

KEN TAYLOR

***English setters (above)** are noted for their affectionate nature and willingness to please, while English pointers (left) are perhaps unequalled for stamina and sheer desire to hunt. Yet, these qualities are amply shared by both dogs.*

style and intensity on point, and is steadfastly staunch in or out of sight. He's forever a source of pride to his hunter and a privilege for those invited into his company.

Which would you rather hunt over?

Most of the mistakes that thwart character development in young dogs occur through haste in seeking basic staunchness. A bird dog is said to be staunch when it will successfully find and approach game birds, establish a point without flushing them, and hold its point until its handler arrives and moves the birds. For this to happen with impressive character, a youngster must understand what is desired and be allowed to practice until proficient, without undue fear or confusion.

This premise becomes the basis for an effective training regimen that will leave the personality in the pup.

★ Reality Check

Realize that, given proper training and adequate game bird exposure, it takes from 18 months to three years for a sharp pup to fully realize and express his undiminished potential. Some of the very best sometimes take the longest, and it's a happy trip worth the wait.

"Pups are like kids in school," observes John Ray Kimbrell, South Carolina's renowned pointing dog professional. "Some learn fast, and others are slower. The best ones come both ways. A lot of people aren't willing to wait on the late bloomers. If you try to push too fast, you usually make a mess somewhere.

"Your dog should set your timetable. Listen to him. He'll let you know what he wants to do...when he's ready for more. So much of dog training is patient repetition."

★ Encourage your pup to hunt.

Take your dog to birdy places and let him be a puppy. Keep discipline to absolute minimum. Your goal is simply for your pup to learn to find birds, flush, chase, have a merry time. Let him range as long as he's not in danger and checks back periodically. You're building desire, ambition and bird-finding skills. Relax and enjoy it.

"We have one man who works with the puppies from the time they're born," explains George Tracy, perhaps the most highly respected professional trainer in the shooting dog game, "takes them home, constantly handles and plays with them. When they get a bit older, he's got them on a bench or barrel, stroking and posing them, getting them used to being handled.

"We let them run and have a good time, wake their natural ambition. Then we'll put them on birds, just sit back and watch, let them chase and flush, whatever. Before long, they learn to point and back on their own."

★ Show your pup what you want and expect.

1. Take your pup off birds completely and yard train on "whoa" and "come."

Failing to spend adequate time in yard training is the Achilles' heel of most amateur training efforts. It's time and it's repetition and it's humdrum—and it's the most important thing you'll ever do for yourself and your bird dog. It's the cornerstone for brilliance, the footing behind the flourish.

When do you start? "Once a pup is finding and stopping on birds," says Tracy, "we'll start yard training in earnest. So many people shortchange the basics and jump ahead of their dog with unreasonable expectations. We do a *lot* of yard work before we get serious about steadying them on game."

For most pups, you're talking 18 months to two years of age.

There are many good books and videos available on yard training, and particularly the "whoa" command, the crux of pointing dog conduct. *All the Answers to All Your Questions about Training Pointing Dogs*, by North Carolina's own Paul Long, recently reprinted, is in my opinion still one of the best. Once you start, carry the task to completion. Use short daily sessions. Do not relent until your dog knows and responds to each command happily and reliably.

2. Reintroduce your pup to birds, using the "whoa" command.

This is the first step to staunchness. If you've done your homework, it'll go remarkably well.

"If a young dog has been fully 'yard broke,'" Tracy notes, "and the timing's right, staunchness becomes the logical result of their introductory bird experience and their

'whoa' training. You avoid the push and pull that causes faults and drains enthusiasm."

Early on, choose training days with a steady, moderate breeze. Plant a couple of pen-raised birds, quail or pigeons, in dense, short cover where they will not be seen by your pup. Lead him in downwind on a 20-foot check cord until he catches the scent and establishes a solid point. Command "whoa!" Ease off the cord, but be ready to stop him if he breaks. Stroke him gently and praise him, repeating the command "whoa" emphatically once or twice more. If he breaks, set him back promptly and reemphasize "whoa." When he's standing well, have someone flush the bird. Hold your dog in check, letting him watch the bird fly away, then calm him and prop him back up. Let him stand a bit longer and think about it all.

Keep your dog bird-hungry. Make an ironclad rule of working no more than two birds per session. With progress, gradually extend the time between the point and the flush, and elaborate the flushing process.

After several sessions, your dog will convince you that he's ready to solo and will likely establish point and stand on his own until you can reach him and grasp the check cord. Now, plant or fly some birds into a relatively small area. Hunt your dog there, letting him drag the check cord. Odds are he will point and hold. Once you gain the cord, work the dog and bird as before. If he starts to break before you get there, command "whoa" firmly, *no more than twice*. If he breaks, catch him as soon as you can, without harshness, and set him back up where he originally pointed. Patience and repetition are the keys. Slow hands, easy touch.

★ **Take the risks.**
Let your pup make his mistakes.

All youngsters will. Dogs are no less fallible than humans.

Gradually lengthen the time you let the dog stand on point as you approach him, with less handling when you get there. Don't rush or caution. Let his intensity swell; he's coming of age. From here on there'll be electricity in the air. Exaggerate the flushing attempt; he's learning to stay in place until the bird gets off. If he appears ready to blow, one cautionary "whoa" now is enough; let him go if he must. Then retrieve him, pick him up and shake him good, put him back in place, and hit him only with a firm "whoa." Praise and style him while he stands there. The tip of his tail ought to swagger after a bit. He's telegraphing a message. He's on the way.

Put him on wild birds and continue the march. Whatever you do, *don't constantly caution* as he gets birdy. Learn to read his body language. Hold the "whoa" until you're relatively sure a firm, productive point has been established and you're ready to flush. If birds fly errantly, think fast and act slowly. He's going to get too close to a few at first. Let him approach them boldly, take his risks, too. He's learning every bounce, banking confidence. Often the best action is inaction. Correct only when you're sure he's at fault. Slow notions, remember.

Soon, he'll turn up missing and you'll find him on point, waiting for you to flush and shoot his birds.

He'll be tall and he'll be proud, an eloquent, unblemished expression of his genes. Just slightly prouder than you. ⊠

***Once your puppy is** responding to basic commands learned in yard training, you can begin field training on live birds with some expectation of fulfilling a dog's true potential to become a good hunting companion.*

Southern TO THE CORE

In Chatham County, Creighton Lee Calhoun Jr. is preserving historic varieties of apples, some that may have been lost without his help.

written by Ted Dossett
photographed by Melissa McGaw

About the fourth turn after leaving the main highway a vague expectancy begins, a sense that something is different. Along the blacktop, then onto a gravel road crowded by the damp, dense summer forest and up a rocky lane through the dim woods, the feeling grows that you're retreating deep into a rural North Carolina of the 1940s or even earlier. But then you pass through the wide gate in the high wooden fence and that impression fades quickly. Instead, you become aware of the contrasts, almost contradictions, of the place. It seems to be a forest clearing encircled by hardwoods, so large they seem to hover, arching into the rim of the opening. The clearing rises slightly toward the far edge then falls away through the woods toward the river. A low, rambling house with a strong Japanese influence crouches beneath the trees on the edge of the clearing—raised wooden walkways flanking three sides. Next to the walkway a thin stream of water falls from a bamboo pipe, slicing neatly into a small goldfish pond.

But it's not really a clearing at all, because it's filled with small apple trees pressed almost flat, "espaliered" on heavy wire strung between poles. The trees carry

***Once a staple on** nearly every Southern farm, more than a thousand apple varieties were grown to suit differing tastes and needs. Today only a few hundred varieties of apples remain. Some surviving Southern varieties (left) include: the Mattamuskeet, Lacy, Jake's Seedling, Sweet Rusty Coat, Winesap and Kinnaird's Choice.*

The cider press proved an invaluable tool for making many apple products. Tommy Glosson of Pittsboro (above) demonstrates the use of a press that has been in his wife's family for more than 100 years.

names like Gloria Mundi, Alexander's Ice Cream, Tillaquah, and they grow in an orchard that holds the last fragments of the 1,300 known varieties of Southern apples that once grew in the Southeastern United States.

Creighton Lee Calhoun slides open the screen door to the porch and motions us to sit. Next to my chair is a wicker basket of stone flakes, red-clay-stained, recognizable as the waste from stone implements made by chipping. I pick one up to look at it.

"I find 'em all over the place. An archeologist friend of mine said the Indians had a quarry here," Calhoun says. "Quite a few of our old apple trees originated with the Cherokees, you know. White settlers found apple orchards in the villages of many Southeastern Indians."

The information is but a fragment of the broad knowledge of apples and their history that flows from Calhoun, the developer of the "preservation" orchard. He's a man of contrasts, a retired army officer with a degree in agronomy, and a deep interest in past and present Southern culture. And his enthusiasm quickly becomes apparent as he talks of his efforts to save from extinction the hundreds of old apple varieties that once grew on farms throughout the South.

"I wanted some apple trees after I built my house, and some elderly friends of mine kept talking about these apple trees they had when they were kids growing up around here. I decided that's what I wanted. That got me started," he says.

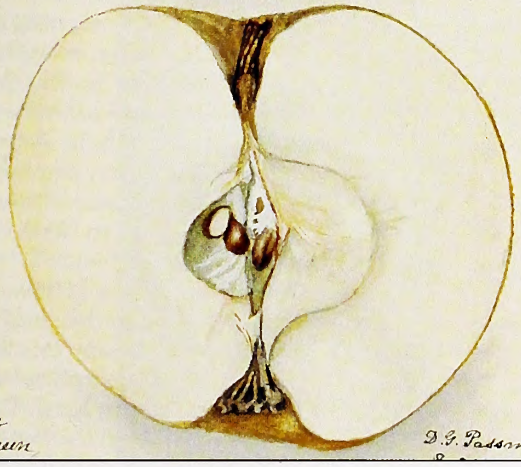
Calhoun's search began slowly; it took about two years before he finally discovered a Magnum Bonum. "That was a great old Southern apple that originated in Davidson County in 1828," he says. "It was strictly a farm apple, and everybody who's over 65 and grew up on a farm remembers it. But it virtually died out. I'm one of just a handful that still sell it."

The realization that these old apples—for so long a cultural as well as food staple of Southern life—would soon vanish turned the 63-year-old Calhoun's casual search into a crusade. He became a Johnny Appleseed in reverse, searching the countryside from the Coastal Plain to the Mountains. When he would spot a tree, he would stop and ask what it was. If it was something he needed, he would return in February for a cutting to graft into his orchard.

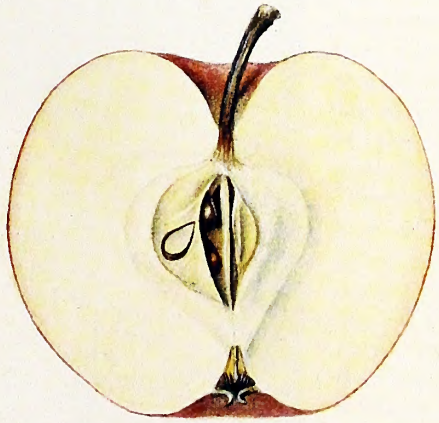
Calhoun's quest has taken him thousands of miles through Tennessee, Georgia,

***Many important** Southern apples (right) have Tar Heel roots. The **Horse** apple, which yields immense summer crops, was the South's most popular apple grown for home use before 1930. The variety likely originated before 1800 in North Carolina or Georgia. Considered the king of the fall apples, the **Magnum Bonum** was prized for its fine flavor. Widely planted, it originated in Davidson County in 1828. For almost two centuries, the **Red June** was the early apple of choice for most Southerners. While a few other apples ripen sooner, only the Red June has enough quality to be eaten raw. The **Limbertwig is** not one variety, but a large family of apples. Most trees have drooping branches and aromatic fruits that ripen in October. In the early 1900s, the Limbertwig was popular in the North Carolina Piedmont and Mountains.*

Horse

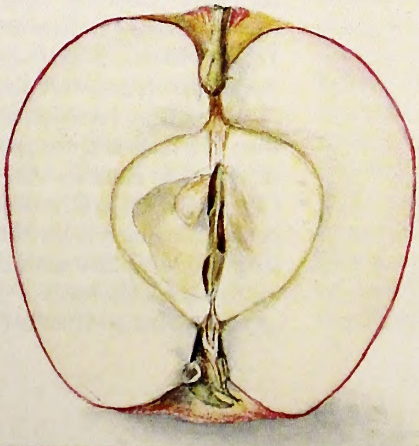


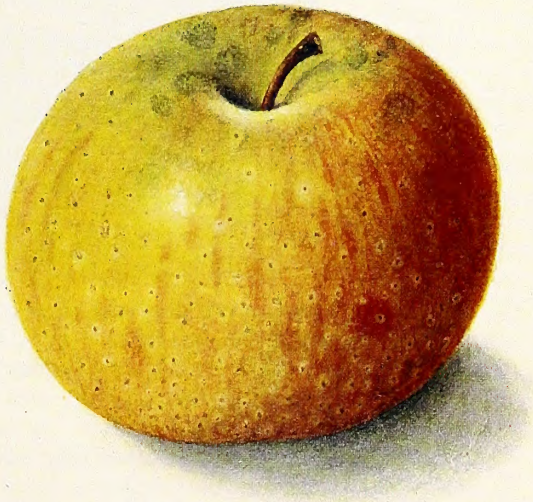
Magnum Bonum



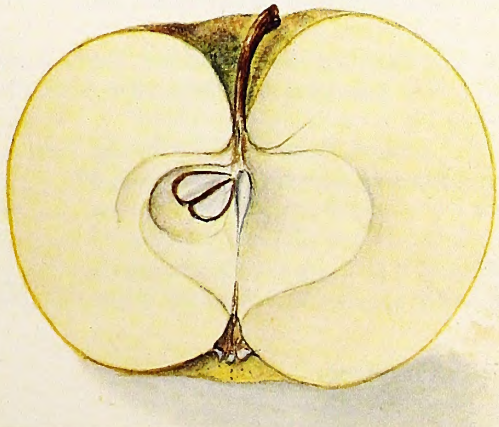
PHOTOGRAPHS © 1997 JERRY MARKATOS

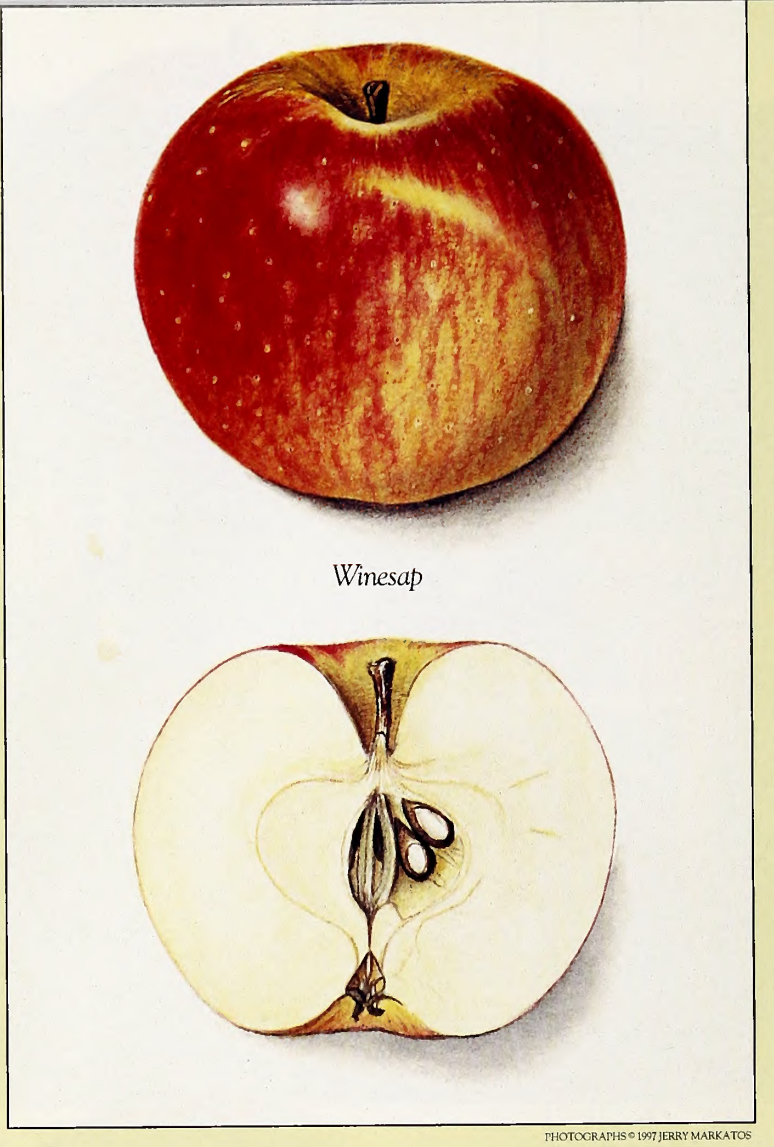
Red June





Royal Limbertwig





Winesap

PHOTOGRAPHS © 1997 JERRY MARKATOS

***Historically, no other** apple comes close to being as popular in the South as the Winesap. The variety can prosper in most southern soils and produces large amounts of fruit. With a delicious fruit that keeps well, this winter apple has long been a Southern favorite for cider and table use.*

Old Southern Apples

Many of the old Southern apple varieties can be ordered from Calhoun's Nursery, 295 Blacktwig Road, Pittsboro, N.C. 27312. A catalogue is available for $1.

One of the best sources for information on Southern apple varieties is Calhoun's book, listed below with other references:

Apples in North Carolina. North Carolina State Board of Agriculture Bulletin. Vol. 21, No. 7. Raleigh, 1900.

Beach, Spencer A. *The Apples of New York*. 2 vols. Albany, N.Y. J.B. Lyon Co. 1905.

Calhoun, C. Lee *Old Southern Apples*. Blacksburg, Va.: MacDonald and Woodward Publishing Co., 1995.

Downing, Andrew Jackson. *The Fruit and Fruit Trees of America*. New York: John Wiley, 1854, 1859, 1878, 1900.

Elliott, Doug. "Stalking the Old Time Apples." *Wildlife in North Carolina*, September 1980, pp.14-19.

Virginia and North Carolina, but he says that West Virginia is the best place to look for old apple varieties because there are so many isolated pockets. "You get back in those coves and hollers where people are still living like they did in the old days, and they're still growing their trees and making apple butter and everything else," says Calhoun. "They still grow Northern and Southern apples; you can find them all up there." And though Southern apples are usually associated with the Appalachian Mountains, nearly every farmhouse had apple trees. Calhoun said he found one old apple tree in eastern North Carolina "within 50 feet of salt water."

Another variety, the Mattamuskeet, is named for that famous lake in Hyde County, seemingly a very unlikely place for growing apples. "But the Mattamuskeet apple was well adapted to eastern North Carolina and would keep all through the winter," he says. "They'd just pile 'em up on the ground, put leaves over top of 'em, usually right under the tree, and keep 'em like that."

In his wide-ranging search from his Chatham County home Calhoun has found not just apples but the legends that go with them. One tells of an unnamed variety grown by Aunt Cora, a black midwife from Bath County, Virginia. The trees were planted from seed by her grandfather, a slave who was owned by a master infamous for his cruelty. In fact, he was so hated that upon his death no one attended his funeral, and it fell to his slaves to bury him. So, probably with some small sense of retribution, they planted him—unmarked—in the slave cemetery. A graft from that apple, now called Aunt Cora's, grows today in Calhoun's orchard.

Another apple in Calhoun's orchard is the Hunge (meaning "hunger" in German), which is thought to have originated about 1720 in North Carolina's Moravian settlements. The Hunge tree that he found in Newton Grove has been around for more than 275 years and was probably the last of its variety. Another variety was named Chestoa, which in Cherokee means "rabbit's head," because it resembles the conically shaped head of that animal. And, according to legend, the seeds of the Tony apple came to Cabarrus County in the pocket of

a wounded (and hungry) Confederate soldier, who picked the apple on the long walk home from Gettysburg. Yet another version says the apple came from a seedling planted by a slave named Tony. But whatever the truth, Calhoun says, it's still grown and highly prized in central North Carolina.

From the first apples that were planted in the New World in the 1600s, some 5,000 to 6,000 varieties have been developed in the United States and the rest of North America. Their importance in the American diet cannot be overstated. In many households apples were eaten every day of the year, whether baked, stewed, fried, jellied, preserved, dried, or mashed into sauce or apple butter. Apples were baked in cakes, pies, turnovers and countless other recipes. Oddly enough, Calhoun notes, relatively few apples were eaten raw. Yet, in a land where the drinking water was often suspect, apples were pressed for juice, cider, apple jack and apple brandy. As early as 1721 one town of 200 families pressed 10,000 barrels of cider—that's 31½ gallons per barrel—and drank it all in one year. And, of course, another sort of pickling was done with vinegar distilled from apples.

Calhoun estimates that up to 90 percent of old Southern apple varieties are now extinct because many never were known beyond the rural communities in which they originated. In his preservation orchard he now has about 360 of those varieties. And he still searches for the old varieties, recently finding a Disharoon, a north Georgia apple of Cherokee origin that he had previously checked off as being extinct.

The discovery of each old apple tree starts a new phase in Calhoun's mission. Since the seed from a given tree may or may not produce an exact copy of itself, he must take a cutting from the parent tree and graft it to another tree or "root stock." It's a slow process, but it's also the surest way to get an exact duplicate of each variety. Through this technique he's also able to graft several different varieties onto a single tree. But Calhoun's task reaches well beyond his labors in the little clearing. He knows that all the searching, planting, grafting and pruning means little if these remnants of history never leave the orchard.

"I've come to realize that if people don't start growing these old Southern apples again, they're goners, because there's no way you can keep them around if people don't start growing them." So he sells his trees, between 1,000 and 1,500 annually. Many of the buyers are rural North Carolinians seeking to replace the old varieties that had once grown on their farms.

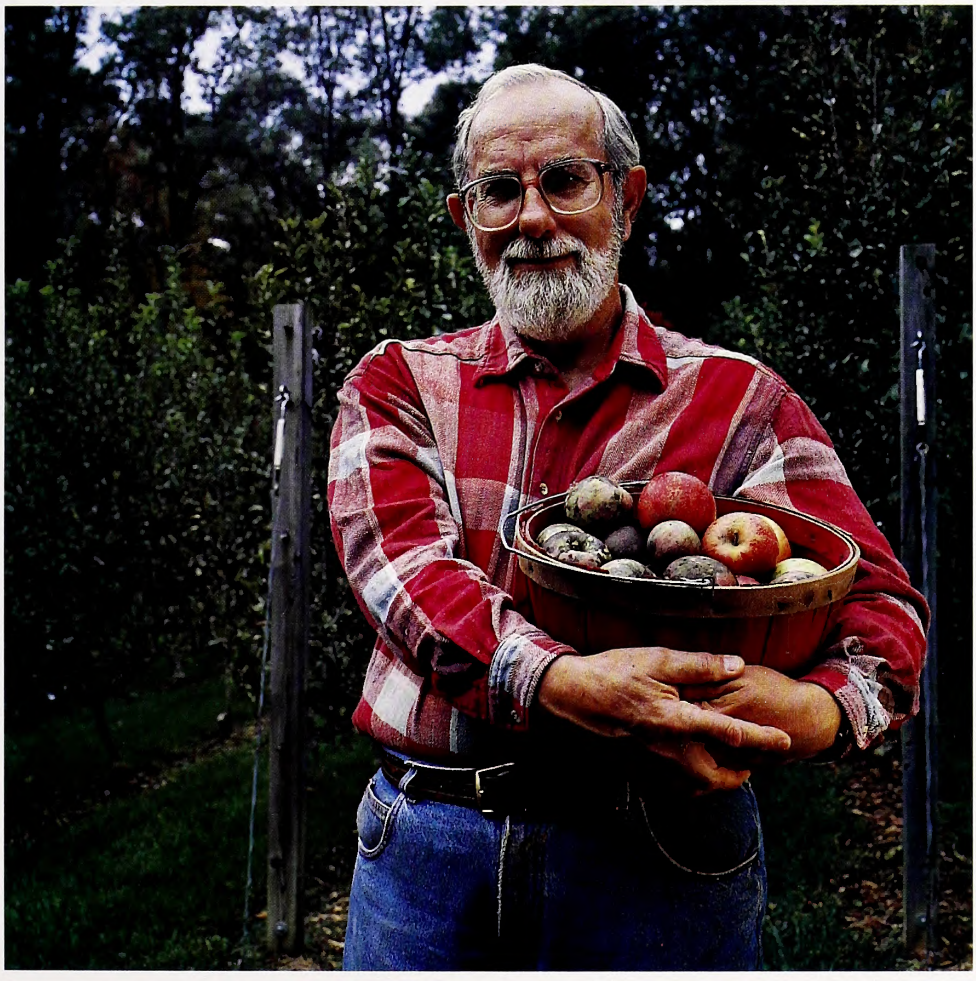
"A lot of buyers will bring their father or grandfather out here, and he'll say he hasn't seen a Blacktwig apple in 40 years, or something like that, and there's that tree right there," says Calhoun. "They wax eloquent about what a wonderful apple such and such was, Red June or June Sweeting. Now that gives me a kick."

Calhoun says the other buyers are often young, urban people who want a garden and a few trees and who want to grow their own food. "They don't want to grow a Red Delicious," he says. "They want something with some history behind it that you can't buy in a store, and they want something that's good and that's adapted to this area."

Calhoun has not always had to search for old Southern apples. Sometimes they have found him. "People actually bring me cuttings from their old trees and ask me to graft 'em to replace an old tree that's dying," he says. "They don't even know what kind of apple it is—it doesn't matter, it's been in their family for 100 years and they want to keep it. That's fine, I'm more than happy to graft those trees."

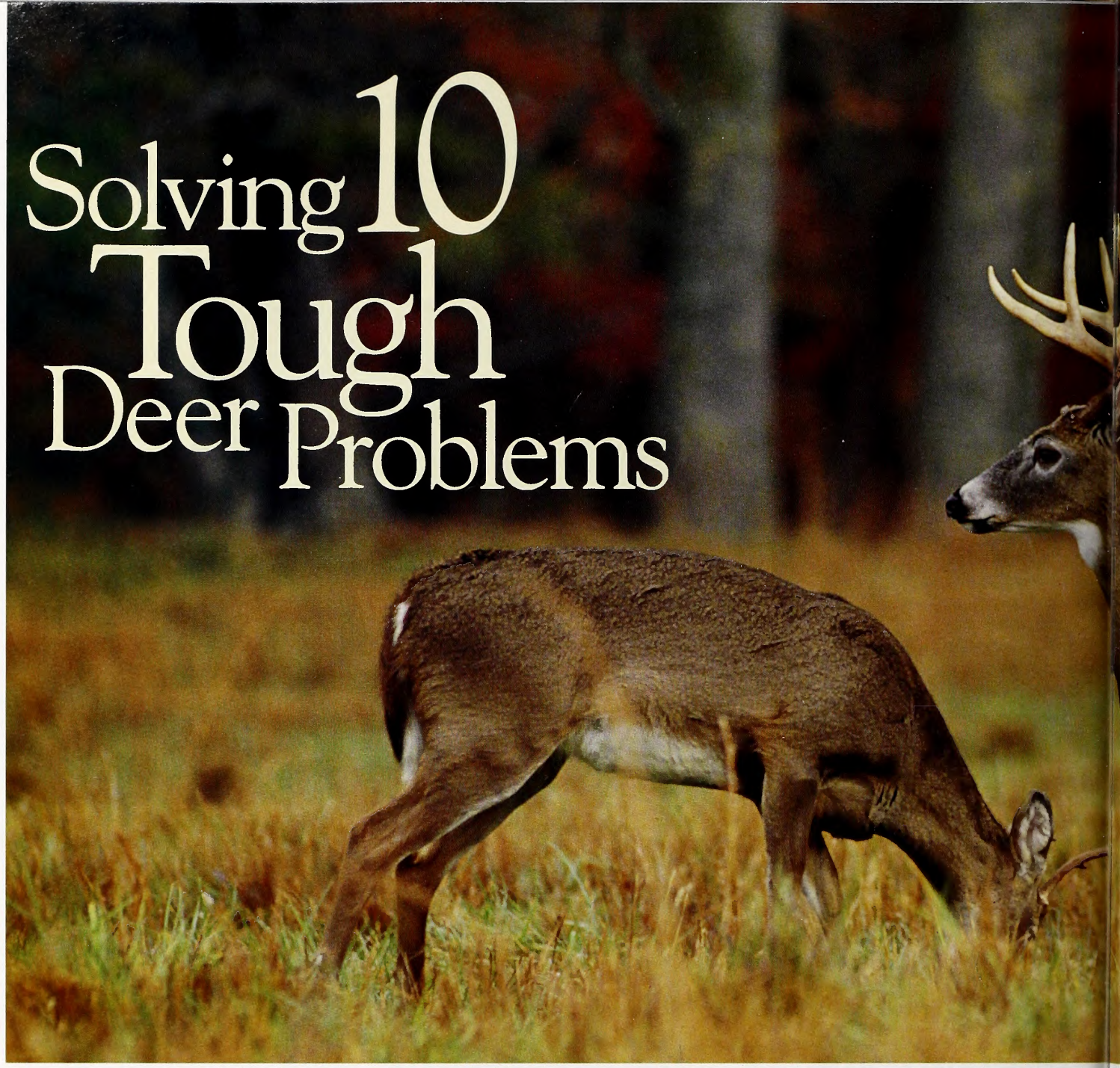
There is a certain irony in Calhoun's crusade to save these old apples. His orchard has become a reverse frontier, where apple trees now grow as a symbol of our past rather than our future. It thrives even as development laps at its edges, where increasingly acrid steam rises from freshly laid asphalt, replacing mists that once hovered over fresh, green meadows. Yet Calhoun does not see himself as a pioneer, but as the preserver of a fragment of the South's rich heritage. He knows that he cannot save every part of that heritage, so he has chosen the apple, the symbol of a more humble time, to keep alive a remnant of that history. And perhaps Calhoun says it best as he speaks of the meaning of his orchard.

"It's sort of like a library of old apples. Instead of books I've got trees out here, and there's a lot of information in these old trees. When I'm gone, this orchard is gonna be gone, but hopefully by then people will be growing these trees, and they'll be out there and at least they'll be safe for a while." ⊠



***Lee Calhoun hopes** he can preserve at least a fragment of the South's rich heritage in its old apples. Calhoun has collected more than 350 old apple varieties which he lovingly tends in an orchard at his Chatham County home.*

Solving 10 Tough Deer Problems



Do these problems sound frustratingly familiar? Here's how to cope.

written and photographed by Gerald Almy ©1997

At its core, deer hunting is basically problem solving. Every time we pick up a bow, muzzleloader, rifle or shotgun and forge into the woods, we're faced with fresh challenges—new mysteries of whitetail behavior, geography, meteorology and hunter psychology to unravel. How well we solve these problems in large part determines upon how successful we are as deer hunters.

You might well have dozens of challenges and puzzles to unravel during the course of a hunting season, but here are 10 that are quite common. These are the ways I've learned to cope with them in over 25 years of deer hunting. Other solutions might work, but these have proven effective for me—at least some of the time.

1

•Extremely hot weather. This is one of the most difficult challenges for a whitetail hunter. If you can be satisfied with a doe or small buck, it's not quite as much of a problem, but larger bucks have an aversion to traveling much in fall when temperatures skyrocket. They will move, feed and breed, certainly, but if temperatures are in the 70s or even 80s, much of this activity takes place at night, after legal hunting hours.

Since this is the response of most bucks more than two years old, the best course of action is to hunt as close to darkness as possible. Be on your stand located close to bedding cover well before first light so the woods will have totally calmed down by the time the first dim light of dawn arrives and the biggest bucks are already slinking back to their day-

WILLIAMS LEA

Two bucks are better than none. But finding a single buck can be a challenge to many hunters. Basic problem-solving and a little knowledge can go a long way to help find that trophy.

time haunts. Also, plan to watch these areas, as well as fresh scrapes and clusters of rubs, right until the final minutes of legal shooting time tick away. If you know of a good food source, hunt trails leading to it, rather than the food plot itself, since the deer likely won't make it to the field until after sunset, when cool night air claims the land again.

Another approach I've had some luck with in hot weather is hunting dense, shady areas, particularly near springs and creeks, where the deer go to escape the heat and get a drink. If you're hunting in the western part of the state, high ridges can also offer colder air temperatures for the deer and breezes that can cool their bodies. Look for benches just off the top, or place a stand just down from saddles where ridge-running bucks cross from one side to the other. Pick the shady side for your stand, assuming the wind direction is right.

•Seeing deer too far to shoot. The average rifle shot at a whitetail is usually 40 or 50 yards. Maybe this is why tradition has made such calibers as the .30-.30 and .35 Remington so popular. I've taken deer with these calibers myself, and I started out hunting with them. But over the years, every now and then I would see a buck across a large field, or on the opposite slope of a canyon that I knew was out of range. Sometimes I would manage to stalk closer and take the animal, but often it would be gone before I got within range. Gradually I realized that even though I was hunting in the East, a more open-country, "western"-type caliber might allow me to take those deer at 200 or 250 yards and still be just as adequately armed for the buck that crossed 50 yards out or jumped up from a thicket at my feet.

The venerable .30/06 was the one I chose, but the .270, .280 and .308 are other good options. With these guns you can shoot the majority of deer that show up close and still be ready for that shot 250—or possibly even 300—yards out if you feel confident shooting at that distance.

•Seeing more does than bucks. There can be several reasons why this happens. In some areas of the state where the deer population is high, the sex ratio is heavily weighted toward does, and what you're seeing simply reflects the makeup of the herd. The only answer in this case is to keep sifting through the does. Sooner or later, especially if the rut is on, a buck will show around these does.

Another option is to consult wildlife biologists or game wardens and try to locate areas with a better sex ratio. Chances are the total population of animals in those areas will be lower, and you may not see as *many* deer. But the odds that one of them will be a buck are better. When you do see a buck in these areas with more closely balanced sex ratios, he's likely to carry a larger rack.

Another reason you may be seeing more does than bucks could be that you're hunting terrain and vegetation that are too open, easy to move through and accessible. Does like these types of areas, but after the first gunshots of the season, larger bucks tend to head for rough, hard-to-penetrate terrain, leaving does and perhaps yearling bucks in the open woods, fields and gentle topography. Seek out the hidden, thick, rugged hideouts and you'll likely find the older-age bucks.

•Sighting deer at dawn and dusk, but not clearly enough to shoot. This is another problem I've learned about from personal experience. On one particular hunt years ago I was in a ground blind right at dusk on the last day of a three-day hunt, and I had yet to lay eyes on a buck. My goal had dropped from wanting an 8 pointer or better to being willing to settle for any legal buck. As the final moments of shooting time ticked away on the gray, heavily overcast day, the shadowy form of a large deer appeared back in the timber. Struggling to

***One of the most** common deer hunting problems is not being able to remain in a tree stand all day. Staying put takes the right attitude, confidence in your location and the know-how to make your stand reasonably comfortable. But the reward of taking a shot at a fine buck can make the waiting worthwhile.*

see through my low-cost binoculars and the budget-model scope on my rifle, I *thought* I saw a buck. But the deer wouldn't step into the open, and with the poor-quality optics I had, I couldn't be totally sure. So, I had to pass up my only opportunity.

I went home and somehow found the finances to buy both a top-of-the-line pair of binoculars and the best-quality rifle scope made. Since then, I've had the comfort of knowing that optical equipment, at least, wouldn't cost me a shot. These days, too, I find the optics even more useful for analyzing rack size and the age of a deer to see whether I want to shoot it.

Buy the best scope and binoculars you can possibly afford and you'll never regret it. A fixed-power 4X will do, but many, including myself, like a variable of 1.5 to 6X, 2 to 7X or 3 to 9X for its versatility. Binoculars can be 8, 9 or 10 power.

While iron sights can be useful for a few very limited situations, my advice is never to use them on a serious deer hunt. Even worse than a cheap scope, iron sights will cost you 15 to 30 minutes of the best hunting time of the day at both dawn and dusk. Since that's when the biggest deer often move, it's not a time you want to lose. Scopes are also more humane, since they allow more accurate, clean-killing shots.

•Not seeing animals, even though sign is present. This is a problem I often had to cope with during my early years of deer hunting. I would see tracks, droppings, worn-down trails and even depressions in fields where the animals had slept. But when I'd set up a stand nearby, no deer would show.

It's a bit embarrassing to admit it, but as a rank novice, I was hunting areas that were used by deer almost exclusively at night and expecting them to show up during daylight. Hunting pressure was heavy enough that bucks and even does were vacating those open areas and moving to denser cover before first shooting light.

By following trails and sign back into thickets, I began seeing animals. Usually I encountered does just a short distance into the brush and thicker timber. But when I worked even farther back into swamps, grown-over clear-cuts and rugged sections of surrounding mountains, more and bigger bucks showed themselves.

Don't always expect well-marked trails to lead to these areas. Sometimes the runways from night feeding areas will peter out, particularly where an older buck takes different routes to his daytime bedding areas. At this point it's time to use your topo map and do some serious footwork to find areas where heavy cover or steep terrain would likely attract a buck. Then it's a matter of putting up a stand nearby downwind and watching early and late in the day.

•Not being able to stay on stand all day. Watching from a stand all day may not be the best strategy if it's hot, hunting pressure is light and the deer aren't rutting. However, if there are other hunters in the woods, the rut is approaching or in full gear, and the weather is at least cool, the period from 10 a.m. to 3 p.m. can be every bit as productive as the early and late hours. In fact, many hunters feel the biggest bucks move at this time because they know few hunters will be in the woods. Hunters leaving or going back to their stands at midmorning and midafternoon can also stir up deer and send them past your location.

Staying put all day takes several things—the right attitude, confidence in your location and a certain amount of comfort. Bring enough clothing to stay warm while sitting immobile for extended periods. Don't wear all the clothes as you walk in, or you'll overheat. Instead, carry them in a daypack and put them on after you cool down from the hike. Don't forget gloves, a scarf and a hat that covers the ears. Also bring a lunch and snacks, as well as juice or water and a thermos of coffee or hot chocolate.

Attitude is also important. Don't look on the day as an endurance contest. You need not stay 100 percent immobile. You can slowly turn your head to look at the woods in all directions around you. In fact, you should do this periodically, so you don't miss deer moving to the side or in back of your position. You can also stand up every hour or two to stretch your muscles. Look around first, though, to make sure no deer are in view.

The final thing that makes staying on stand all day a goal you can accomplish is having confidence in the area. That comes from plenty of preseason scouting so you know you've picked one of the best spots possible on the hunting area available to you.

•Extremely windy weather. A light breeze is good for deer hunting. It keeps your scent from settling in like a cloud around your stand. It also lets you know which way to still hunt and where to locate your stand so that the deer will be least likely to pick up your scent as they approach.

But a heavy, gusting wind is another story entirely. This is one of the worst conditions for deer hunting. It makes bucks, especially larger ones, skittish and even more alert than normal. They rush wildly about, heads turning in every direction.

The best solution I've found is to try to locate areas that aren't as intensely affected by the wind. Look for low spots in dense swamps or thick conifer groves where the wind doesn't penetrate. That's where the deer often go to await calmer weather. In mountainous country, head for the lee side of hills and slopes and protected hollows, where the terrain blocks the brunt of the breezes. Whitetails often gather in these areas, where the wind doesn't rob them of their defenses of smell and hearing and they feel safer. Still hunt or take a stand in these protected areas where sign is abundant and a good supply of food such as acorns or forbs is available.

•Too many hunters nearby. This is one of the problems deer hunters complain of most. After you've put in days, sometimes weeks, scouting and you have patterned the bucks in your area, it's disheartening to have another hunter come ambling through at 9 a.m. because he got cold and is headed back to his truck or camp.

You can solve this problem in one of two ways. The first approach is to give up on the high-pressure areas near roads and hike in at least a mile or two, setting up camp and hunting there. Of course you should scout this backcountry before the season opens to know where sign is present and where you can expect to waylay a buck. Chances are good you won't see another hunter.

The second approach is to make the other hunters in the woods work to your advantage. On your map, plot the locations of parking lots or wide spots in the road so you'll know where most hunters will enter. Then look for rough, steep terrain, swamps or areas with thick vegetation. Sneak into these spots well before first light and take a stand at the escape areas themselves or trails leading to them.

By getting a jump on other hunters, you'll already be waiting at escape areas when deer flee the pressure at first light. Circle wide around the spots you think deer might be using before daylight, so you don't spook the animals yourself, and be certain you place your stand so the wind blows away from where you expect the deer to appear.

•Seeing small bucks, but no large ones. A reality check is needed here. Sure, we'd all like to see trophies every hunting day, or even once or twice a season, but it's not likely to happen. Most bucks harvested are going to be 1½-year-old deer. And until there's an attitude shift and a majority of hunters start passing up deer like that to let them attain some age, that's likely what we're going to continue to see.

By carefully choosing where you hunt, however, you can at least increase the odds of seeing an animal with a larger rack. One choice is to hunt on private, managed hunting property where only a small number of mature bucks are taken each year. If you can't get into such a club or afford the fees a commercial operation charges, there are occasionally public opportunities to hunt areas with higher numbers of trophies. If a certain tract was closed for hunting for several years and then reopens, that's an excellent bet. Don't overlook public areas that have terrain that's simply too remote or difficult to penetrate for the average hunter, either. There may be pressure in the easily reached parts of these public hunting areas, but by hiking far in from the road, you can reach lightly hunted spots where big bucks are more abundant.

Finally, don't overlook very small, neglected tracts of public land or private land that you could gain permission to hunt. Sometimes these little pockets are so small that hunters drive right past them to get to the big tracts. But if they are more than 20 or 30 acres and have some thick cover, they could hold a heavy-racked old deer during the hunting season.

•Late-season, post-rut bucks. Some rutting activity takes place in North Carolina in December, but the majority of it is over by late November. After that impetus for bucks to move is gone—plus the pressure of months of hunting and the fact that fewer bucks are still alive—late-season hunting can be particularly challenging.

Food, shelter from the weather and escaping hunting pressure become the major driving forces for deer. They are seeking only to survive at this point—not to find a mate or show their prowess by fighting other bucks.

Look for out-of-the-way food supplies such as secluded wheat or clover fields near a thicket, honeysuckle, forbs, or areas with acorns left. Then search for fresh tracks nearby. Hunt very early and late near these bedding, feeding and heavy cover spots, and hunt from a stand placed downwind.

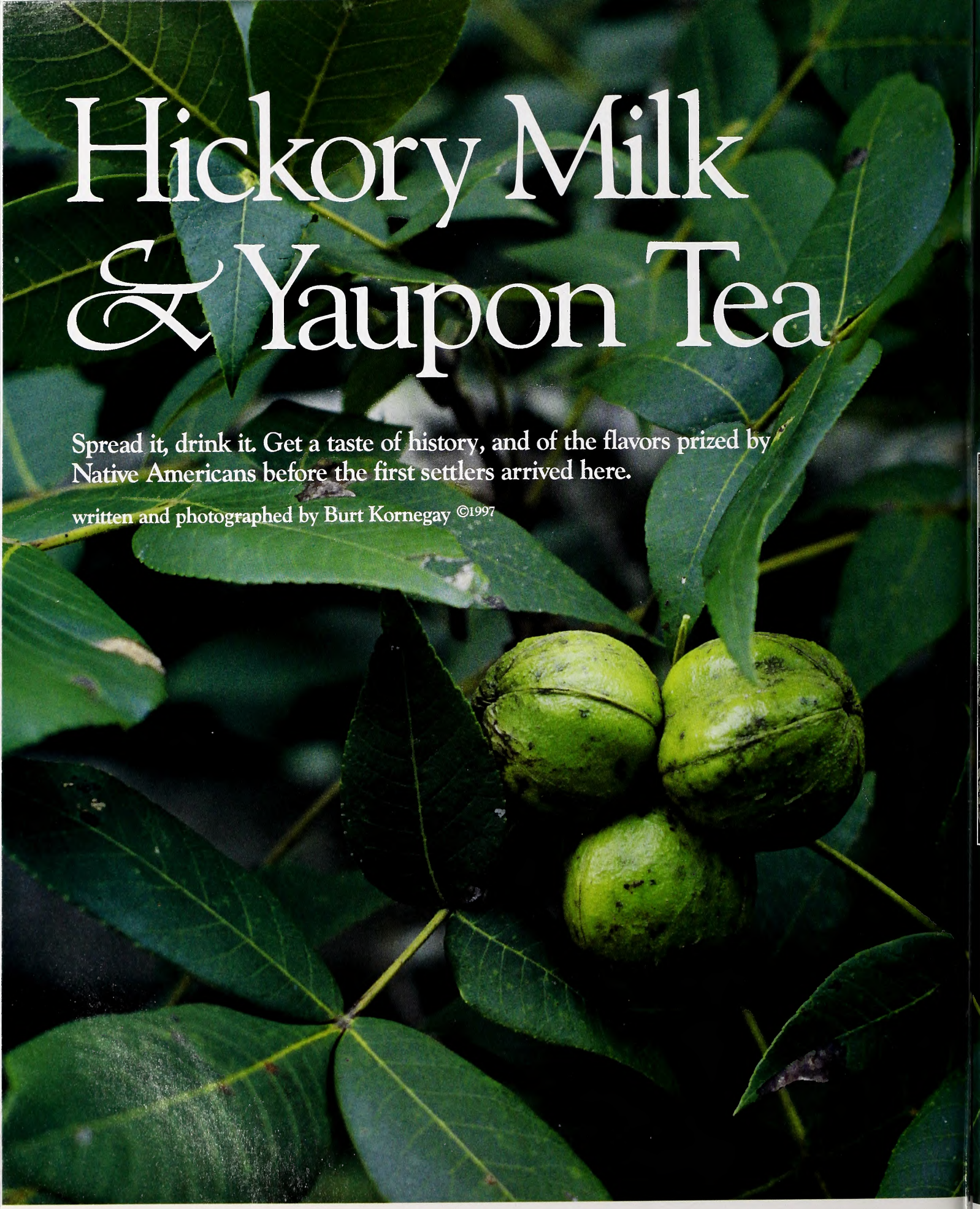
If temperatures are extremely cold, look for south-facing slopes on mountains and areas protected from strong winds. Also, look for dense escape cover. This should be as thick as a jungle, high on a mountain slope, or far from roads in a dense swamp or grown-up clear-cut. These are the secret spots whitetail bucks seek out after the rut is finished, searching for a sanctuary until season's end. ☒

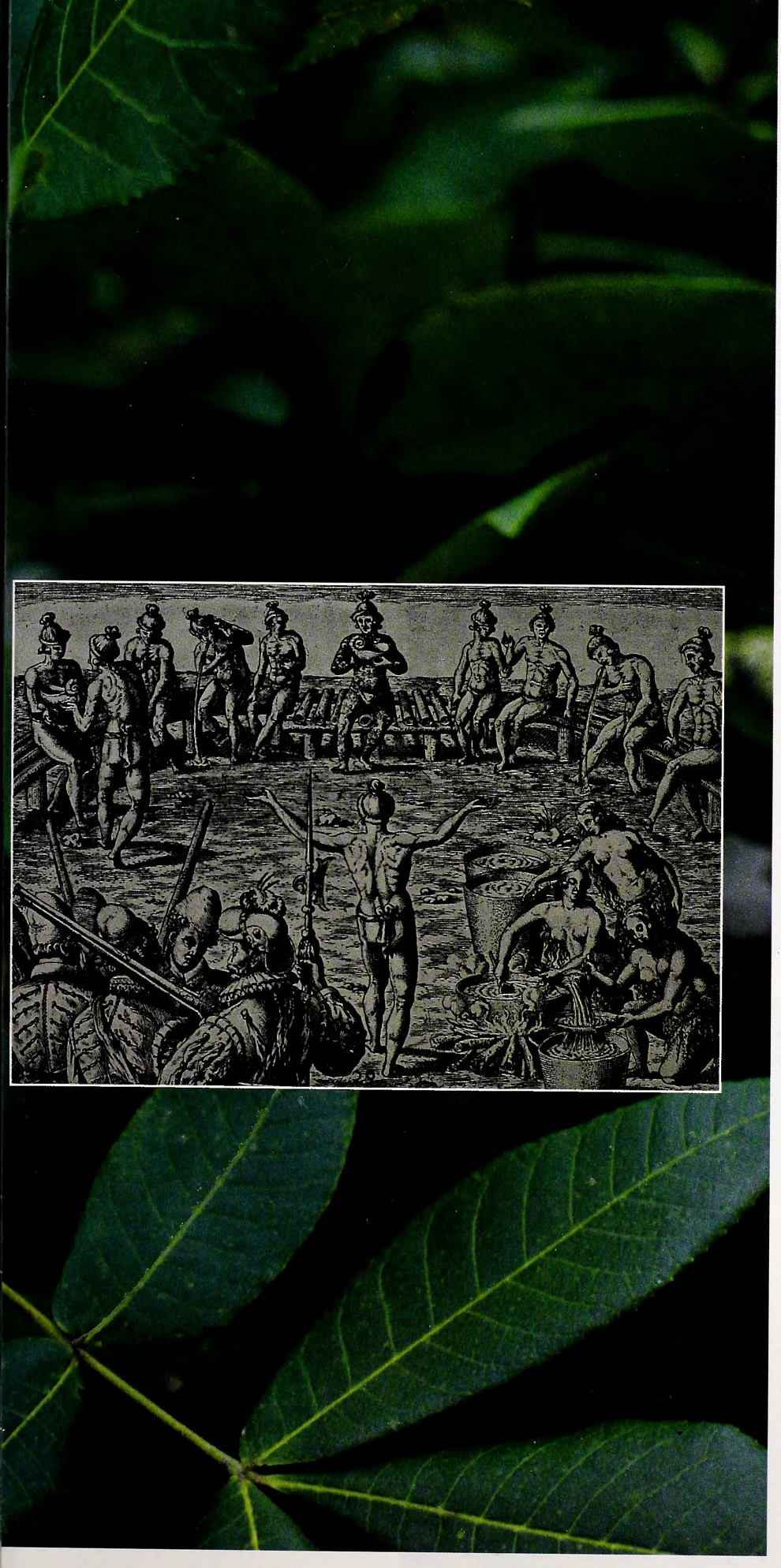
***With the rut over** and deer scattered, late-season hunting can be particularly challenging. To find bucks, look for out-of-the-way food supplies near thickets and dense areas protected from the wind. These secluded spots can spell success for the patient hunter who is willing to leave the beaten path.*

Hickory Milk & Yaupon Tea

Spread it, drink it. Get a taste of history, and of the flavors prized by Native Americans before the first settlers arrived here.

written and photographed by Burt Kornegay ©1997





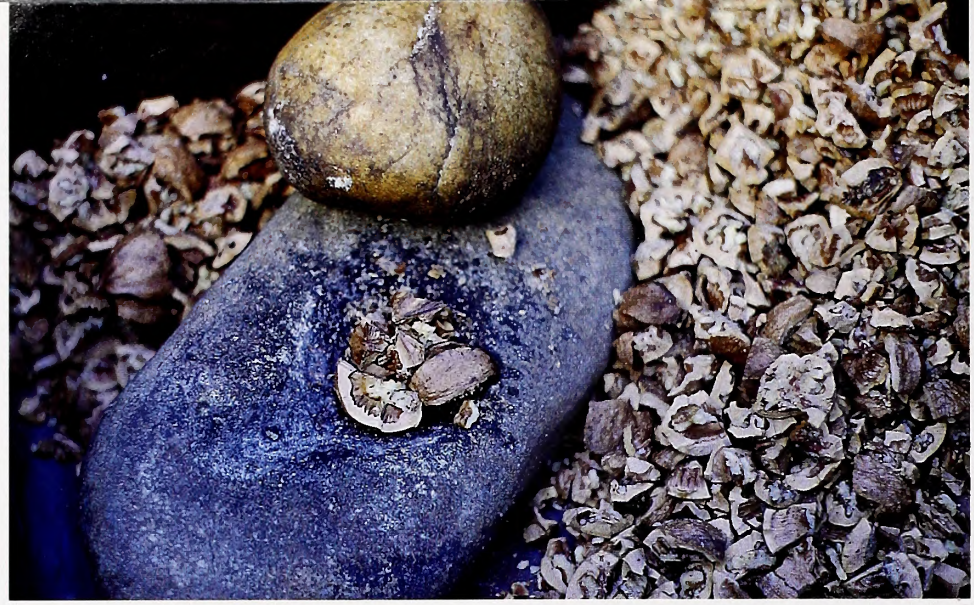
Few white men knew the Indians of the American Southeast as did the Scotch-Irishman James Adair. For 33 years, from 1735 to 1768, he lived among the Catawba, Cherokee, Chickasaw and Choctaw as a trader. He learned their languages, observed their ways, traveled, hunted and fought alongside them, and admired their brave independence. And in 1775 he published a book about these tribes entitled *History of the American Indians*.

Adair writes that once, when still a greenhorn on the southern frontier, he sat down as the supper guest of a Cherokee household and had a basin full of what he describes as "vegetable thick milk" placed before him. Adair had never seen the like before. But, he relates, "as ranging the woods had given me a keen appetite," he eagerly started to sup on the liquid anyway, only to hear the Indians around him burst into laughter. No doubt Adair felt sheepish, because, as he puts it, just "when the basin was in danger...the good-natured landlady, being informed of my simplicity, shewed me the right way to use the vegetable liquid." The "right way" to use the liquid, Adair found out, ending his story, was not as a beverage or soup but as a spread for bread—the same way he would use butter.

Thus went Adair's humorous introduction to a food that had been eaten by the Cherokee and other Indians of the Southeast for at least 10,000 years. It was a rendered nut oil, and the traders called it "hickory milk."

The fall ripening of such wild nuts as acorns, chestnuts, walnuts and hickories (all of them protein and fat rich) was as important to the Southeastern Indians, in their dietary provisioning for winter, as it was to the bears and squirrels. And perhaps the most sought after of all these nuts were those of the hickory itself—or *pohickery*, *pokahichory* and *powcohicora*, as the first English explorers of the New World variously spelled it, trying to pen the Indian word for the tree. The early explorers reported that during wild food forays each fall, the Indians gathered prodigious quantities of nuts from such "sweet" hickories as the shagbark, shellbark, and mockernut. (The nuts of a few hickory

***Mockernut is a** common sweet hickory that was used by Native Americans for making hickory milk (background). Coastal tribes had another favorite product that was carried inland for trade—yaupon. This old engraving (inset) by Theodore de Bry after the original painting by Jacques Le Moyne shows Timucan Indians in Florida in 1565 drinking yaupon tea.*



The easiest way to *crack hickory nuts is to smash them with a nutting stone, then boil the whole business until the nuts separate from the shells and the "hickory milk"—prized as a spread or flavoring—forms on the surface (above). Other native foods were equally imaginative and nutritious. An example is this stew of venison, chestnuts and sassafras roots cooked in a soapstone bowl (below).*

species, such as the bitternut and water hickory, are bitter.) And in 1775, the same year in which Adair published his book, the Philadelphia naturalist William Bartram, exploring the South, wrote, "I have seen above an hundred bushels of these nuts belonging to one family."

If you have ever tried to crack a hickory nut and dig out its meat, you are probably wondering how anyone could possibly shell a hundred bushels of them! True, the "kernell [is] great, very oylie and sweete," as Thomas Hariot noted in 1588, but it also "hath a verie ragged and harde shell." Generations before Hariot sailed to America and tried to coax the sweet kernel out of a hickory nut's tough shell, however, the Indians had discovered a comparatively easy way to get at it and to prepare the nut for use. And it is a way that will work as well for you today as it did for them so long ago.

To make hickory milk, collect the fallen nuts from any of the sweet hickories and dry them, either beside a fire, in the sun or in a hot attic. Next, set a flat stone—archaeologists would call it a "nutting stone"—in a large basin or in the middle of a bedsheet. It should be a rock that does not crumble. Kneel facing the nutting stone, set a box of nuts to your left, take out a nut and place it on the rock. Now, with a baseball-sized "hammer stone" clutched in your right hand, give the nut a good hard smash. Then put another nut on the base rock and smash it, then another, and another, working into a Stone Age rhythm. Don't stop to pick up the pieces—just keep on smashing nuts, letting the debris fall off the nutting stone where it will. Pretty soon you'll find yourself "knee deep" in crushed hickory nuts.

Next, bring a large pot of water to a boil and dump in the nutty carnage, shells and all. Keep the water simmering, and within a few moments you'll detect a delightful, aromatic smell coming from the pot, filling the air with its fragrance. You'll also notice a remarkable separation taking place in the pot: the pieces of hickory shell are sinking to the bottom, the nut meats are swimming just below the surface, and floating on the surface of the water itself, an oily foam (the "milk") is starting to gather. Skim off the foam (some of the Indians used a large turkey feather for this, but a spoon will do), bottle it, and use it as a spread. You'll find it tastes milder than butter and, as Bartram says, "It is as sweet and rich as fresh cream." This "milk" can also be mixed in any kind of corn dish, and it can be put on fried vegetables and meat.

The nut meats still swimming in the pot can be used the same way you would use walnuts or pecans. Strain them out of the broth and spread them on a tray to dry. I find the meat to be a tasty addition to any

cooked cereal; and the Southeastern Indian scholar Charles Hudson tells me his mother used to put them in fudge. The Indians often pounded the nut meats to powder and added the powder to cornmeal when making bread, and to soups for flavoring.

Last, if you happen to have some venison, try cooking it "Indian style," with the pot of leftover hickory nut broth. Along with the venison, leave in some of the nut meats, and add corn, beans and squash—the vegetable "three sisters" of the Eastern Indians. Stew it until the venison is well done.

Because the oil from hickory nuts was prized by the Indians, it was an important trade item with them. In 1798 the Indian agent Benjamin Hawkins noted that the trading value of 1 quart of hickory milk was equal in value to 19 pounds of pork! And Bartram once met a caravan of packhorses bound for the Atlantic coast, carrying skins filled with nut oil.

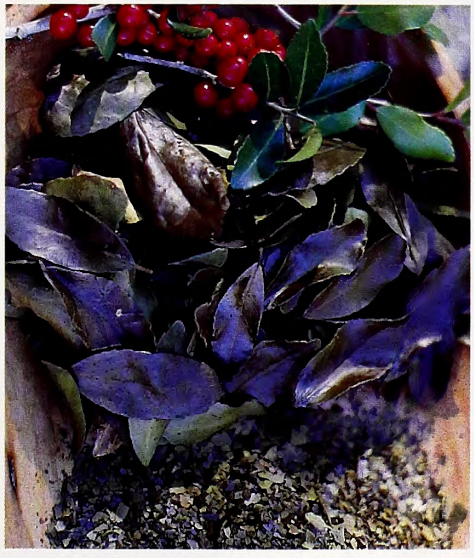
On their return journey, those packhorses that Bartram saw might have carried inland another food that was equally ancient in use among the southeastern Indians—and that was even more valuable to them than nut oil in trade. This was the shining green leaf of the coastal holly, known as "yaupon" or "cassina," from which the Indians made a caffeinated tea. In 1708 the North Carolina explorer John Lawson wrote, "the famous *Yaupon*...is us'd and approv'd by all the Savages on the Coast of *Carolina*, and from them sent to the Westward *Indians*, and sold at a considerable Price."

Growing in thickets, yaupon is an evergreen shrub or small tree, covered in the fall with bright red berries. It grows along the Atlantic coast from Florida to Virginia and on the Gulf coast to Texas. Its simple, alternate, leathery leaves are 1 to 2 inches long, with rounded teeth on the margins.

The Indian tea made from yaupon was an adult, male-only brew, drunk from conch shells by the chiefs, warriors and other men of the villages during assemblies in their council houses. Consuming it in large quantities during religious ceremonies, men also used the stimulating drink to purge themselves—hence the scientific name for the species, *Ilex vomitoria*, which unappealingly translates to "vomit holly." Charles Hudson writes that after drinking yaupon tea during these ceremonies, the men would sometimes "hold their arms across their chests and expell the contents of their stomachs 6 or 8 feet." The Indians brewed the tea so strong that pioneers called it "the black drink" because of its color. But, as Hudson notes, in their own languages the Indians called it "the white drink," because white symbolized purity, social harmony and happiness.

In his *Travels*, Bartram relates a solemn black drink ceremony that he witnessed in 1776 between the chiefs and the white traders in the Creek town of Attasse. As Bartram describes it, first the red and white dignitaries are seated in proper order inside the council house, with the Indian king and the chief white man in front. The council fire is lit, and then,

> *two middle aged men, who perform the office of slaves or servants, pro tempore, come in together at the door, each having very large conch shells full of black drink, and advance with slow, uniform, and steady steps, singing very low but sweetly...They stop together and, bowing very low...each presents his shell, one to the king and the other to the chief of the white people; and as soon as he raises it to his mouth, the slave utters or sings two notes, each of which continues as long as he has breath; and as long as these notes continue, so long must the person drink.*



***The roasted leaves** of yaupon (Ilex vomitoria) were crushed to make a tea which, when made very strong, was a purgative. The red berries of yaupon are poisonous.*

The Indians were not the only ones who esteemed the black drink. Adair writes, "it is well tasted, and very agreeable to those who accustom themselves to use it." Indeed, Adair states that he prefers American yaupon to the Asian tea drunk by the British, declaring that he has found it to be "friendly to the human system," in contrast to the "noxious quality" of the "East-India insipid and costly tea." And, showing himself to be a member in spirit of the Boston Tea Party, this fiercely independent frontiersman concludes his high praise of yaupon with the following exhortation to his fellow Americans:

> *Let us, therefore, like frugal and wise people, use our own valuable aromatic tea...shewing the utmost indifference to any duties the statesmen of Great-Britain, in their assumed prerogative, may think proper to lay on their East-India poisoning, and dear-bought teas.*

Other frontiersmen may have been less politically motivated than Adair in his published preference for yaupon tea; they simply drank it and liked it. And you may discover that you like it, too.

If you don't know what yaupon looks like, the next time you are at the coast, take the Peterson *Field Guide to Edible Wild Plants* and go in search of a black drink thicket. Yaupon is such a common plant of the maritime forest that, to find it, chances are all you need to do is park your car by any wooded roadside and walk to the nearest bush.

I recall the first time I ever recognized yaupon; it happened to be planted as a trimmed ornamental hedge outside the entrance to a government building at the coast. I was so excited by my discovery that, unable to restrain myself (and hoping no one would notice), I tried to stroll nonchalantly around to the back of the hedge, where I furtively picked its leaves, stuffing my pockets with a green that, in the flush of the moment, seemed more valuable to me than money!

Wherever you find yaupon, here's a quick way to harvest the leaves: grab a twig down at its first fork and pinch it between your thumb and the base of your index finger. Then pull firmly and rapidly toward you up the stem. The leaves will strip off the twig, in the process forming a green bouquet in the palm of your hand. Gather a quart bag full.

To make the tea, first put the leaves in a pan and slowly roast them before a fire or in the oven. When they are thoroughly dried and greenish black, crush them. To a cup of these roasted and crushed holly leaves pour a quart of boiling water and let it steep. Within a minute the water will turn greenish and the tea will be ready to drink. (If you wish to try a manly, stomach-churning brew, add another cup of the roasted leaves to the water and boil it black.) Pour the tea through a strainer or cloth.

Adair might not like the comparison, but I find yaupon tea (the milder version) to be similar to Asian tea, though slightly more herbal in taste. Also—and this would certainly aggravate Adair—I like to drink it the way the British might, with milk and sugar. ☒

Burt Kornegay is a professional wilderness outfitter and guide who runs Slickrock Expeditions, in Cullowhee, N.C. 28723.

Who cooks for you?

HOO-hoo-to-HOOoooooo!

Don't shut that window when you go to bed tonight. Leave it open so you can hear night noises; that's a barred owl asking about your kitchen help!

Written and illustrated by Consie Powell

NORTH CAROLINA'S SILENT HUNTERS

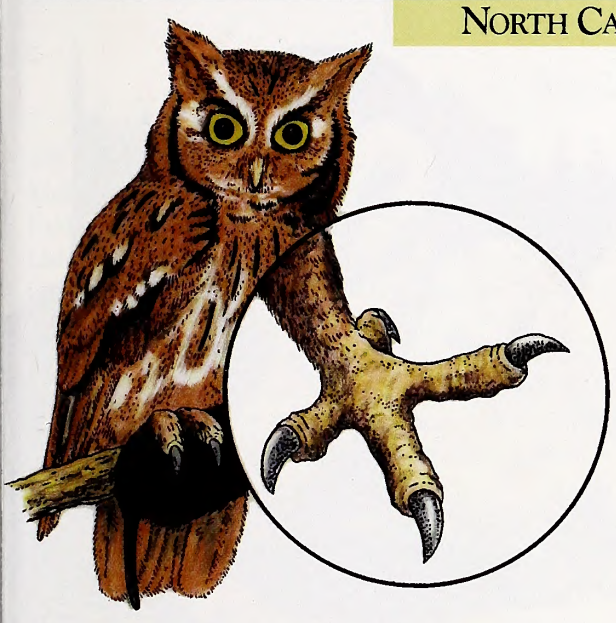
Have you ever wondered how a **nocturnal** predator can hunt in the inky dark of night?

Large eyes collect more light than small eyes, and the huge eyes of owls enable them to see exceptionally well in the dark. Owls have excellent **binocular vision** because, like human eyes, owl eyes face forward. This enables an owl to judge with incredible accuracy the size and speed of its prey and the distance it must fly to reach it.

Owls' hearing is so remarkable that some owls locate prey by sounds alone, and all owls use hearing as much as they use sight. The ears are large openings hidden behind the stiff circle of feathers around an owl's eyes. This **facial disk** is actually an extension of the ears, and it acts as an antenna dish to trap, concentrate and funnel sounds to the ear openings.

After detecting prey by carefully watching and listening from a perch, an owl swoops down, glides silently and captures its prey with outstretched **talons**. It kills the prey with a bite to the back of its neck, then carries it to the perch to eat. Small prey are swallowed whole; large prey are torn into smaller pieces. An owl cannot digest all parts of the prey it swallows. Hair, feathers and bony materials are **regurgitated** as **pellets** eight to 12 hours after an owl eats a meal.

*The **barred owl** (length 18 in.-24 in.) is probably the noisiest owl in North America, and its "HOO-hoo-to-HOOoooooo" is a frequently heard night-time call. It lives in wooded swamps, river bottoms, moist woodlands and dense forests. It preys on snakes, lizards, small birds and rodents.*

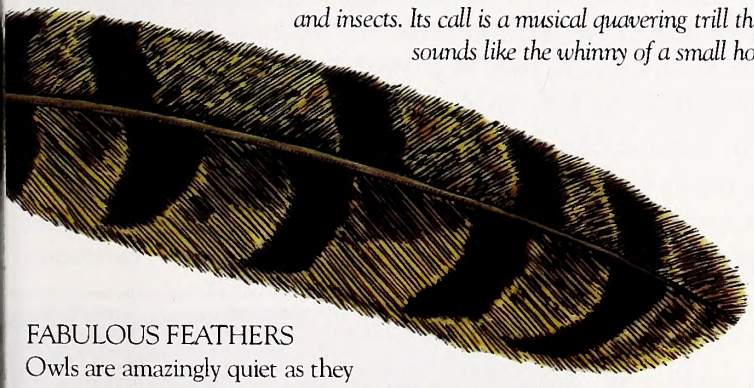


WHAT DO OWLS DO WHEN THEY'RE NOT HUNTING?

During the day, an owl rests on a roost and digests the food it caught the previous night. An owl uses the same roosting spot day after day. This roost might be a crevice, a natural cavity in a tree, or a tree branch, but the owl chooses a roost that is well hidden and protected from the weather. The owl's coloration and the broken patterns of light and dark feathers help **camouflage** it while it roosts.

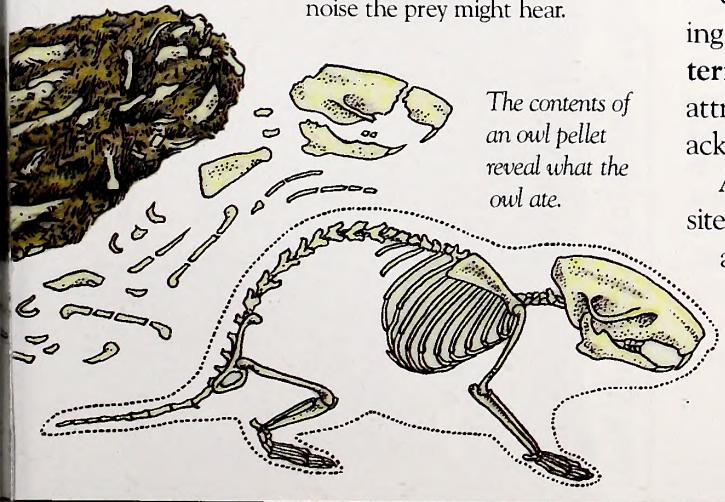
*The **great horned owl** (length 18 in.-25 in.) is North Carolina's largest owl. Found in dry woodlands, it preys primarily on rabbits and medium-sized rodents but will even eat skunks. You can hear its deep "HOO! who-who-who HOO-HOO!" from several miles away.*

*The **eastern screech owl** (length 8 in.-10 in.) is a common resident of open woodlands near the coast, where it hunts small mammals, birds, reptiles and insects. Its call is a musical quavering trill that almost sounds like the whinny of a small horse.*



FABULOUS FEATHERS

Owls are amazingly quiet as they pursue and capture their wary and elusive prey. Soft body feathers muffle movement noises, and a soft fringe on the edges of flight feathers eliminates the gentle whistle of flying. This enables an owl to listen to its prey as it flies and eliminates any noise the prey might hear.



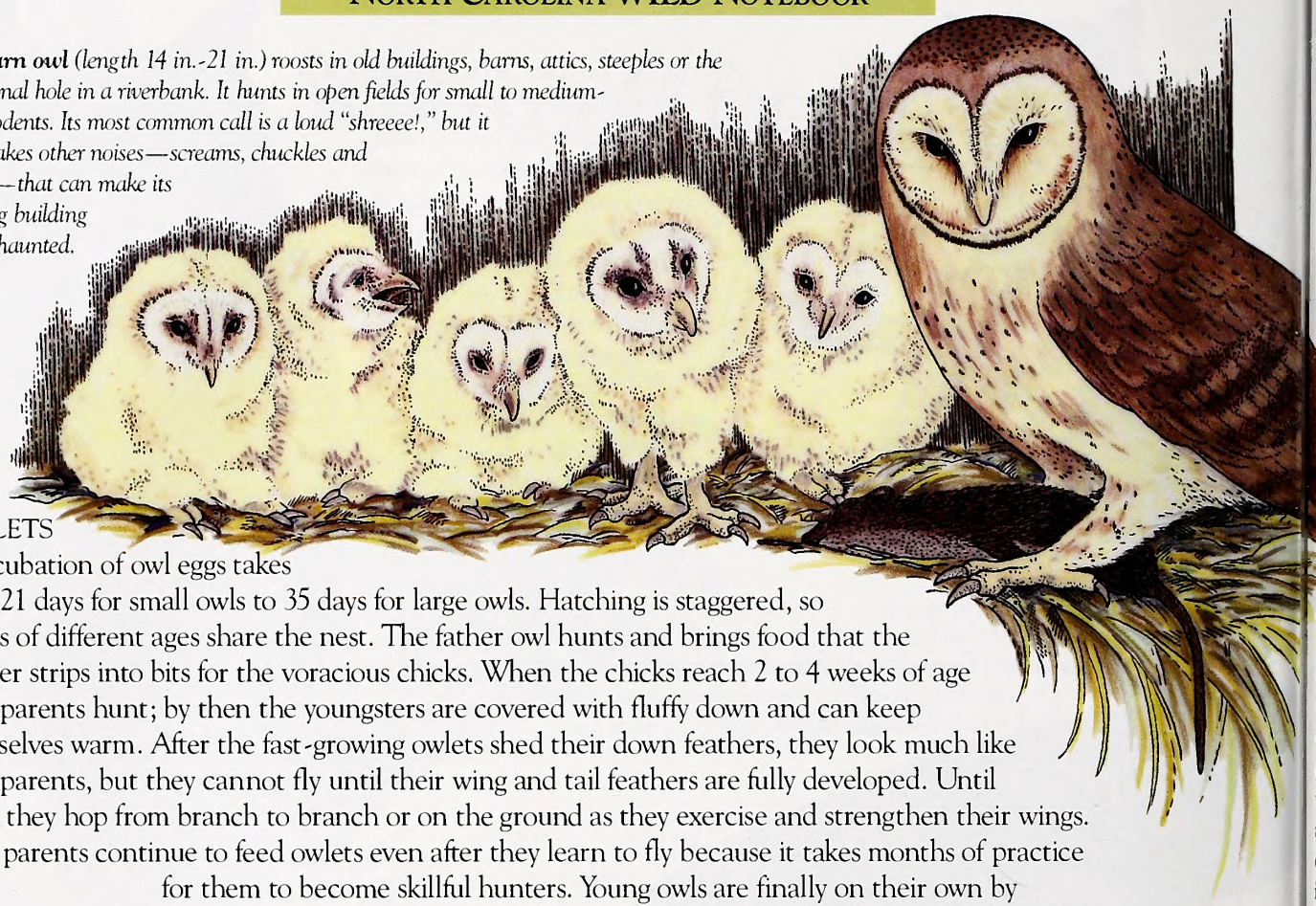
The contents of an owl pellet reveal what the owl ate.

WHY DO OWLS HOOT?

Owls hoot for the same reasons other birds sing. During autumn, owls call frequently as they establish hunting **territories**. In late winter or early spring, different calls attract a mate. During **courtship** a pair of owls sings duets to acknowledge and cement their acceptance of each other.

After a female owl accepts a mate, the pair selects a nesting site together. Depending on species, owls choose a tree cavity, an old woodpecker hole, or an abandoned hawk or crow nest. The female lays several eggs two to four days apart, and begins **incubating** as soon as the first one is laid. During this time the male hunts, feeds his mate and defends the nest against intruders.

*The **barn owl** (length 14 in.-21 in.) roosts in old buildings, barns, attics, steeples or the occasional hole in a riverbank. It hunts in open fields for small to medium-sized rodents. Its most common call is a loud "shreeee!," but it also makes other noises—screams, chuckles and snores—that can make its roosting building sound haunted.*



OWLETS

Incubation of owl eggs takes from 21 days for small owls to 35 days for large owls. Hatching is staggered, so owlets of different ages share the nest. The father owl hunts and brings food that the mother strips into bits for the voracious chicks. When the chicks reach 2 to 4 weeks of age both parents hunt; by then the youngsters are covered with fluffy down and can keep themselves warm. After the fast-growing owlets shed their down feathers, they look much like their parents, but they cannot fly until their wing and tail feathers are fully developed. Until then, they hop from branch to branch or on the ground as they exercise and strengthen their wings. Both parents continue to feed owlets even after they learn to fly because it takes months of practice for them to become skillful hunters. Young owls are finally on their own by autumn, but only 50 percent of owlets survive into adulthood. The others die while young, mostly of starvation.

LOOK BEHIND YOU

Owls cannot move their eyes in the sockets so an owl raises, lowers or turns its entire head to see sideways. An owl's neck is so flexible that it can turn its head completely around, or even upside-down, to look backward.

*The **northern saw-whet owl** (length 7.5 in.- 8 in.) is named for its courtship call: "SWEEE-awwww SWEEE-awwww," but the more commonly heard call is a long series of rapid whistled notes: "too-too-too-too-too-too-too." This tiny owl breeds in the mountains where spruce-fir forests meet hardwoods, and it winters in dense pine and cedar stands elsewhere in the state. It hunts small woodland rodents.*

Can you match each

WANT TO LEARN MORE?

GET OUTSIDE!

Make an owl nest box: Saw-whet, screech, barn and barred owls will use nest boxes. Find directions for construction in *The Complete Birdhouse Book*.

Listen for owls: What owls do you hear where you live? Can you imitate the calls?

Go owling: Determine what owls live near you. Read *Owl Moon*, then try calling for owls some quiet night.

Look for owl pellets: Locate a roost in an old building or grove of tall trees (but don't disturb the owl) and look for pellets on the ground below. Collect a few, soak in warm water until they are soft, then pick them apart with a toothpick to determine what the owl ate.

WHAT DOES IT MEAN?

nocturnal: active at night.

binocular vision: the ability to see two overlapping images, one from each eye, which allows three-dimensional vision.

facial disk: the flat dish-shaped pattern of feathers around the eyes and beak on an owl's face that enhances hearing.

talons: long needle-sharp claws on the four toes of each foot of an owl.

regurgitate: to spit or cough up without digesting.

pellet: a compact regurgitated mass of undigested bones, fur and feathers.

territory: an area with sufficient habitat and food to support a pair of owls and their offspring.

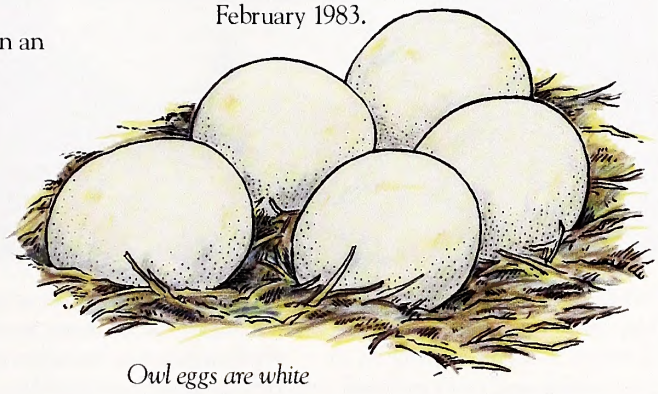
courtship: the ritual behavior involved in securing a mate.

incubate: to keep eggs the proper temperature so they will hatch.

camouflage: the use of color, pattern or shape to help an animal hide itself.

READ AND FIND OUT

- *The Book of North American Owls* by Helen Roney Sattler, Clarion Books, 1995.
- *The Complete Birdhouse Book* by Donald and Lillian Stokes, Little, Brown & Company, 1990.
- *Owl Moon* by Jane Yolen, Philomel Books, 1987.
- *One Man's Owl* by Bernd Heinrich, Princeton University Press, 1987.
- *Tiger With Wings* by Barbara Juster Esbensen, Orchard Books, 1991.
- In *Wildlife in North Carolina:*
  "Friendly Ghosts" by Terry Shankle, December 1985.
  "The Night Hunters" by Jane Rohling, February 1983.



Owl eggs are white and quite round.

LET US KNOW

What kinds of owls have you heard? Where did you find owl pellets? Why do you like owls? Please share your responses, special owl experiences or pictures with us. Mail them to the North Carolina WILD Notebook, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

IT'S WILD!

Project WILD activities for teachers and students that correlate to this topic include:

Owl Pellets: teaches students to construct a simple food chain.

Everybody Needs a Home: teaches students that people and animals share a basic need to have a home.

Seeing is Believing or The Eyes Have It!: teaches students to identify different kinds of vision as an example of adaptation in animals.

Adaptation Artistry: teaches students to identify and describe the advantages of bird adaptation and to evaluate the importance of adaptations to birds.

Editing and design by Consie Powell. Art puzzle by Anne Marshall Runyon.

Puzzle Answers
Eastern screech owl ..... open forests ..... moth
Great horned owl ..... dry woodlands ..... rabbit
Barred owl ..... swamps ..... snake
Barn owl ..... open fields, towns ..... meadow vole
Northern saw-whet owl ..... mountain evergreen forests ..... deer mouse

Study Examines Roles of Predators and Habitat in Quail/Songbird Declines

JACK DERMID

***While some bobwhite** quail eggs hatch successfully, many more are destroyed by a host of predators. A major study underway in North Carolina and Virginia attempts to document the effects of nest predators and habitat improvements on quail and songbird populations.*

Written and Edited by Rodney Foushee

The fact that bobwhite quail numbers are down across the Southeast comes as no surprise to most hunters. Over the past 30 years, hunters and biologists have watched southern quail populations, including those in North Carolina, steadily decline across the region.

Wildlife managers estimate bobwhite numbers are down about 75 percent from levels recorded in the early 1960s. Equally disturbing, the numbers of many grassland songbirds that depend on similar habitat as quail have also plummeted.

A four-year study launched earlier this year attempts to document the effects of nest predators and habitat improvements on quail and songbird populations. The cooperative effort, between the N.C. Wildlife Resources Commission, N.C. State University and the Virginia Department of Game & Inland Fisheries, hopes to come up with practical solutions that landowners can use to reverse the negative trend.

Scientists are confident that changes in the rural landscape over the past few decades are largely responsible for the steep decline in quail and songbird populations. Modern farming practices along with changing land uses have removed much of the quality nesting and brood-rearing habitat required by the birds. But biologists also speculate that predators are taking a heavy toll on the remaining birds.

"The changes in our landscape have definitely made nest predation a more serious issue in North Carolina," said Mark Jones, the Wildlife Commission's assistant small game project leader. "The birds are constrained by poor habitat and become easy targets for a variety of predators."

An earlier Virginia study, using remote cameras, showed that more than two-thirds of all monitored quail nests were destroyed by predators chiefly opossums, raccoons, foxes and skunks. Many of these mid-sized predators have flourished in recent decades as trapping has decreased.

To test the effects of removing these mammalian predators, along with habitat improvements, biologists in the joint study began selectively trapping and removing animals on farms in three eastern North Carolina counties and one Virginia county. Trapping of target nest predators began in February and ran through June. In conjunction, biologists improved habitat on some test farms in each of the four counties by planting field borders, managing ditchbanks and managing native vegetation. Other areas received no treatment.

With one full field season of research completed, wildlife biologists have confirmed that a large number of animals besides the target species feed on bobwhite quail eggs. Opossums accounted for 54 percent of the 379 target predators captured with raccoons second followed by gray and red foxes. Skunks were only captured in Virginia.

Numerous other species were trapped or observed with remote cameras while disturbing artificial nests containing bobwhite eggs. "One of the things we learned is that many peripheral species like crows, snakes and rodents account for some nest predation," Jones said. "Until we can measure the effects of these species, it will be hard to fully explain the impact of our target mammals."

In general, the overall level of nest destruction increased over the test period on sites with and without predator removal. Most removal areas showed a slight decrease in nest destruction over areas where no predators were removed.

This month, biologists and N.C. State students will evaluate the habitat improvements and predator removal efforts by conducting quail covey counts on the test farms. Additional students will examine the productivity of more than a dozen songbird species.

One year is not enough time to draw solid conclusions about the effectiveness of removing nest predators, Jones said. "What is important is to see if we can keep predation lower on areas that are trapped over several seasons," he said. "Over time we may see a decrease in predation, but it is still too early to tell."

Three New State Fish Records Set

Despite the ravages of two hurricanes a year ago, southeastern North Carolina anglers have set three new state fish records so far this year.

Gregory Demery of Lumberton landed a 17-pound, 15-ounce bowfin while fishing with cut bait on the Black River on June 21. Two days later, Edward Davis of Fayetteville took a 2-pound, 4-ounce redfin pickerel with a minnow in the Gallberry Swamp. The fish surpassed the previous state records of 17 pounds, 3 ounces and 1 pound, 9 ounces, respectively. Both of the old records had stood unchallenged for more than 20 years.

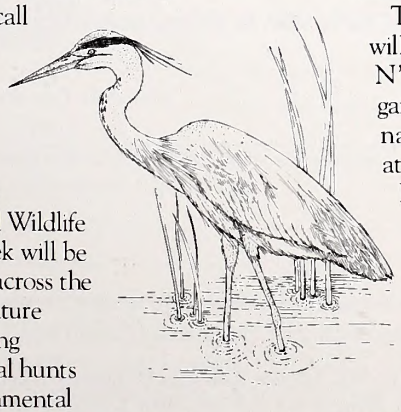
Gregory Hughes of Clinton also established a state record with his 3-pound, 12-ounce brown bullhead catfish taken with a nightcrawler on April 26. The fish, caught in Buck Hall Creek in Duplin County, is the first recognized state record for the species.

Outdoor Calendar of Events

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

Oct. 4-12

The North Carolina Zoo in Asheboro will sponsor its fourth annual juried art show, titled *An Eye on Nature*. Featured art themes will focus on wildlife diversity, conservation and environmental protection. The show will be held in the W. David Stedman Education Center at the zoo with artwork available for sale. For more information, call Debbie Kennedy at (910) 879-7453.



Oct. 12-18

National Wildlife Refuge Week will be celebrated across the country. Nature walks, birding tours, special hunts and environmental education programs are planned. For more information about events scheduled at North Carolina's 11 national wildlife refuges, contact the nearest refuge office or call 1-(800) 344-WILD.

Oct. 17-19

The Carolina Decoy Collectors Association will hold its fall meeting at the Holiday Inn in Elizabeth City. Events will include a field trip across Currituck Sound to the Mackay Island National Wildlife Refuge and a visit to a local gun club. Those interested in waterfowl and decoy collecting are invited to attend. For more information, call Joseph Pace at (910) 762-9060.

Nov. 2

The city of Raleigh will sponsor its first N'Art Extravaganza, an art and nature festival, at Lake Johnson Nature Park. The event will feature arts, crafts, nature booths and explorations. For more information, call (919) 831-6640.

The 1998 North Carolina Wildlife Calendar is Here!

This detail of Robert B. Dance's "Hoigh-Tide Marsh" is one of 12 fine paintings featured in the 1998 North Carolina Wildlife Calendar. Order now before they're sold out.

The works of Robert C. Flowers, James A. Brooks, Robert B. Dance, Dempsey Essick, Bob Herr, Denise Nelson, Duane Raver and Raney G. Rogers are featured in the 1998 North Carolina Wildlife Calendar.

Order yours today! Payment must accompany your order. Calendar orders may be charged to VISA or MasterCard, or enclose your check or money order (payable to NCWRC). Complete the form below and mail with payment to:

1998 Calendar, N.C. Wildlife Resources Commission
512 N. Salisbury Street, Raleigh, N.C. 27604-1188
(Office is located at 322 Chapanoke Road in Raleigh.)

GREAT CHRISTMAS GIFT!

Please send me _____ Calendars at $6.00 each .....$_____

All N.C. residents add $.36 sales tax per calendar ..... _____

☐ Enclosed is my check for **total** payment of .....$_____

☐ Charge to MasterCard or VISA for the calendar(s) ordered above. My card number is _____ and the expiration date is _____/_____.

_____ (_____)_____
Card holder signature | Day Time Phone No.

If ordering 7 or more calendars, please provide your UPS deliverable address.

Name _____

Address _____

City/State/Zip_____

Phone (_____) _____

All orders must be prepaid. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512). **For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CAL098

N.C. Wildlife Resources Commission Produces Trout Fishing Map Book

From Murphy to Mount Airy, North Carolina is blessed with an abundance of mountain trout streams. With thousands of miles of varied streams to choose from, most trout anglers must first make the difficult decision where to go fishing. A new trout stream map booklet produced by the N.C. Wildlife Resources Commission should help anglers make more informed decisions no matter what sort of stream they want to fish.

More than two years in the making, the *North Carolina Trout Fishing Maps* book is the first of its kind to show all of the state's designated public mountain trout waters. Covering more than 2,100 miles of streams in 25 western counties, maps of each county containing trout streams managed by the Wildlife Commission are presented in a large atlas format. Streams are color-coded to reflect the specific regulations in effect for that stream, and colors match those on signs that are placed at various locations along each waterway.

Each map also depicts game land boundaries, federal lands, state parks as well as major roads and towns. The opening page of the book details license requirements for fishing in North Carolina public trout waters and explains each of the six stream regulation classifications used by the Wildlife Commission.

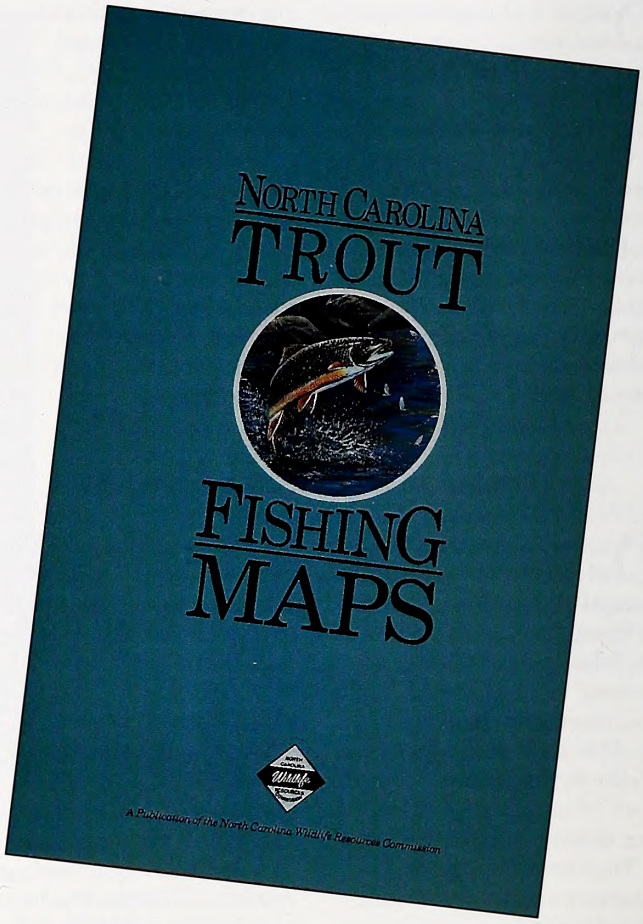
The closing page of the booklet lists 10 streams and lakes that provide universal access to public trout waters in North Carolina. Each entry provides detailed directions to the universal access area and lists specific improvements made including piers, platforms and paved paths to give disabled citizens a chance at wild and stocked trout.

"We think this publication will provide the angling public with a tremendous resource," said Jim Borawa, the Wildlife Commission's regional cold-water research biologist. "The booklet not only lets anglers see what public trout waters are available in each county but it also helps them better understand the fishing regulations in effect on specific streams."

One thing the map book doesn't do is rate individual trout streams or tell fishermen what they can expect to catch on each stream. "We wanted to show people where the available trout waters are in North Carolina, but still leave room for anglers to explore the streams on their own," Borawa said.

The Wildlife Commission is charging $12 for the map books to cover production costs. A free listing of the state's fishing regulations and public mountain trout waters is also provided in the *1997-98 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* available where fishing licenses are sold.

Trout map books will be available at various tackle shops and outdoor outfitters across the state. To order the map books directly from the Commission, use the form at right.



Trout Map Book, P.O. Box 29607, Raleigh, N.C. 27626-0607
(Office is located at 322 Chapanoke Road in Raleigh, (919) 662-4377.)

Please send me _____ N.C. Trout Map Books at $12.00 each .$_____

All N.C. residents add $.72 sales tax per map book ..... _____

☐ Enclosed is my check for **total** payment of .....$_____

☐ Charge to MasterCard or VISA for the map book(s) ordered above. My card number is _____ and the expiration date is _____/_____.

_____ (_____)_____
Card holder signature | Day Time Phone No.

Name _____

Address _____

City/State/Zip_____

Phone (_____) _____

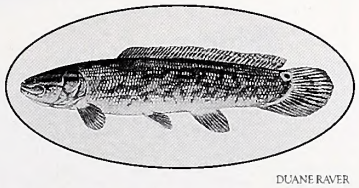
Make checks payable to: N.C. Wildlife Resources Commission. All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512).

North Carolina Issues Mercury Warning for Bowfin

Elevated levels of mercury in bowfin have lead the state health director to issue a statewide advisory that recommends people limit consumption of the fish species to no more than two meals per month.

Children, pregnant women and those of child-bearing age should avoid bowfin altogether because the developing brains of unborn and young children are more sensitive to mercury poisoning, according to health director Dr. Ronald Levine.

Bowfin, or blackfish, are commonly found in slow-moving rivers and lakes in eastern North Carolina. Bowfin from seven North Carolina river basins contain higher than normal levels of mercury. Tissue samples taken from bowfin in the Cape Fear, Neuse, White Oak, Lumber, Tar, Roanoke and Chowan/Pasquotank river basins show average mercury levels exceed one part per million for 28 out of 94 areas sampled. The samples were used to evaluate bowfin stocks statewide.



DUANE RAVER

Routinely eating large amounts of fish with elevated mercury may cause permanent brain damage. The advisory is designed to protect individuals who often catch and eat fish from these areas.

While not commonly eaten, surveys conducted by the N.C. Wildlife Resources Commission suggest that bowfin is eaten by some in the seven basins sampled. Commonly eaten fish like bass, catfish and bluegills were also sampled, but elevated mercury levels were found only in bass in the Lumber River basin and the following lakes: Ledbetter, Black (Bay Tree) and Phelps.

Once mercury gets into the water, it can be converted into another chemical called methymercury that fish absorb and eat. Virtually all fish contain some level of mercury. The highest concentrations occur in older and larger predatory fish, like bass and bowfin, that live longer and feed at the top of the aquatic food chain. To avoid mercury, it is better to eat the younger, smaller fish.

—Information courtesy of N.C. Division of Environmental Health

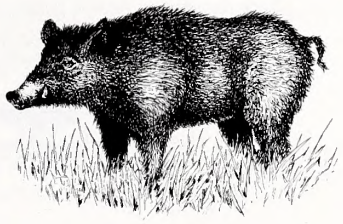
Boar Tagging Ended

Tar Heel boar hunters will no longer be required to tag their kills. The big game tag for wild boar has been eliminated from the 1997-1998 North Carolina hunting licenses.

"Hunters usually tag and report less than 200 wild boar each year and we have been printing more than 300,000 tags," said Richard Hamilton, the Wildlife Commission's assistant director. "The Commission decided to eliminate the tagging of wild boar, but hunters still will be required to report their kills."

Wild boar harvests can be reported with a toll-free telephone call to 1-800-I GOT ONE (1-800-446-8663) or by contacting a Cooperator Agent.

—Bodie McDowell



Field Notes

Eastern Gun Deer	Opens Oct. 13
Eastern Bow and Arrow Deer	Closes Oct. 4
Central Bow and Arrow Deer	Through Nov. 8
Northwestern Bow and Arrow Deer	Through Nov. 15
Western Bow and Arrow Deer	Closes Oct. 4; Re-opens Oct. 13
Eastern Muzzleloading Deer	Oct. 6-11
Western Muzzleloading Deer	Oct. 6-11
Black Bear	See *Regulations Digest*
Wild Boar	Opens Oct. 13
Gray Squirrel	Opens Oct. 13
Fox Squirrel	See *Regulations Digest*
Fox	See *Regulations Digest*
Raccoon and Opossum	See *Regulations Digest*
Ruffed Grouse	Opens Oct. 13
Mourning Doves (first season)	Closes Oct. 4
Rails, Gallinules and Moorhens	Through Nov. 8
Crow	See *Regulations Digest*
Bobcat	See *Regulations Digest*

Migratory waterfowl regulations unavailable at presstime. For waterfowl seasons and limits, call 1-800-675-0263 after Labor Day. Information on bag limits, either-sex deer seasons and other regulations may be found in the *1997-98 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission.

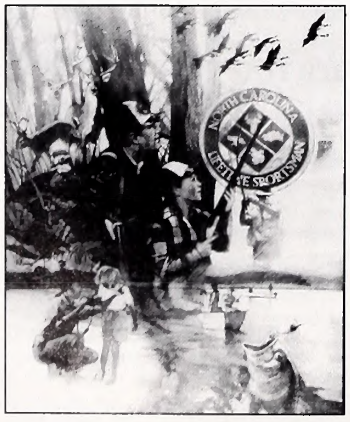
Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.
- Connect to the Commission's online web site at **http://www.state.nc.us/Wildlife/**

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report



Totals Through July 1997

Principal Balance
$23,976,256.09

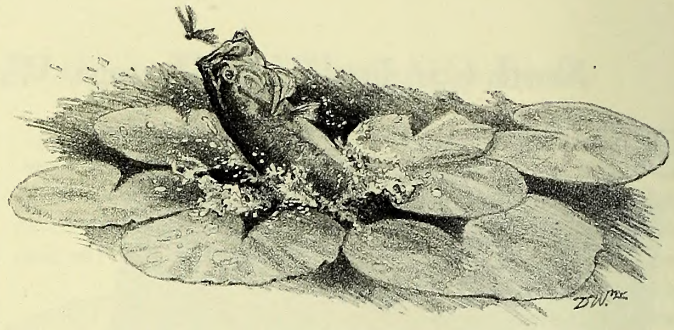
Interest Earned
$22,972,701.63

Total Receipts
$46,948,957.72

Interest Used
$12,329,807.04

Fund Balance
$34,619,150.68

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.



Fall Roundup

by Rodney Foushee

The arrival of cool, crisp air is a good sign that summer has finally passed. Though the days are getting shorter, October can be a busy month for helping fish and wildlife.

Stocking Time: Fall is the perfect time to stock sunfish and channel catfish in a new or reclaimed pond. But don't add any largemouth bass until next June. This gives the sunfish time to grow over the winter and begin spawning next spring before the bass can eat all of them.

Bluegills and shellcrackers are both good bets for small ponds. Stock ponds at a ratio of 10 sunfish fingerlings for each bass to achieve a balanced fish population. For more information about pond management, call the Wildlife Commission's Division of Inland Fisheries at (919) 733-3633.

Planting and Marking Fruit: October is a good month to begin planting fruit-bearing trees on your land like crabapple and dogwood. Fruit-producing trees offer a valuable food source for many varieties of wildlife. Fall planting gives the trees a chance to take hold before winter sets in. Young trees can be protected with wire or plastic shelters to prevent excessive damage from deer and other browsers.

While you're in the woods, this is a fine time to mark neglected and overgrown fruit trees for "releasing" later in the winter. Look for neglected apple trees near old home sites and abandoned orchards. Overgrown wild trees including crabapple, persimmon and holly can be identified by the fruit still on their branches. Mark the trees with brightly-colored flagging tape so you can easily locate them in late winter to cut back larger trees and vines that block out sunlight.

Western Hummers: Think twice before taking down that hummingbird feeder this fall. Just because the ruby-throated hummers you've been seeing all summer are heading south doesn't mean other species won't take advantage of your sweet offering.

Several western hummingbird species occasionally stray from their normal migration routes and stop off in North Carolina during the fall and winter. The rufous hummer is the most often reported of these western stragglers. The male rufous can be easily identified by its reddish-brown color.

N.C. WILD STORE

Explore the Mysteries of Nature

NATURE'S WAYS

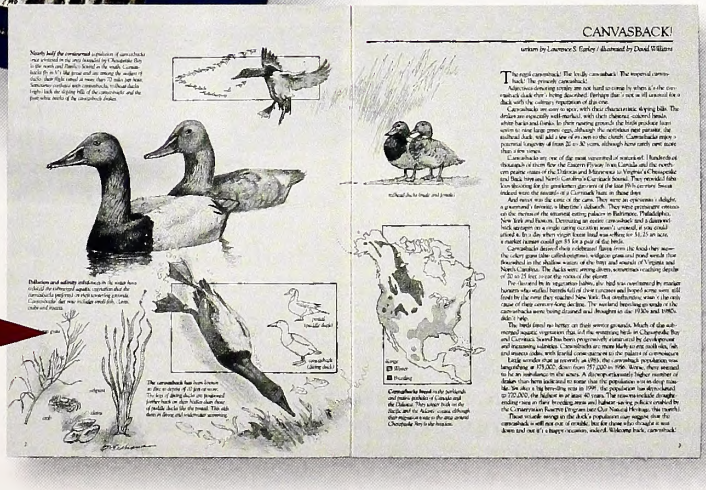
Natural History Essays from Wildlife in North Carolina

Why do some birds decorate their nests with snake skins? Why is the Roanoke bass found in only a few rivers in North Carolina? How did the ivory-billed woodpecker become extinct?

For nearly 20 years, the illustrated "Nature's Ways" columns in the pages of *Wildlife in North Carolina* have answered scores of questions like these in brief, entertaining essays. Now more than 200 of these essays have been collected in six paperback volumes that will delight readers, young and old, with their eye-opening insights into North Carolina's natural curiosities.

A wonderful gift for every nature lover!

Sold only as a 6-volume set. **$27.50.**
ITEM CODE **M9**



Short essays and beautiful illustrations have been the formula to the popularity of "Nature's Ways" over the years. This article on the comeback of the canvasback duck in North Carolina is one of over 200 articles in the collection. They can easily be photocopied and used in the classroom, and parents and children also can read them together at home.

More terrific items

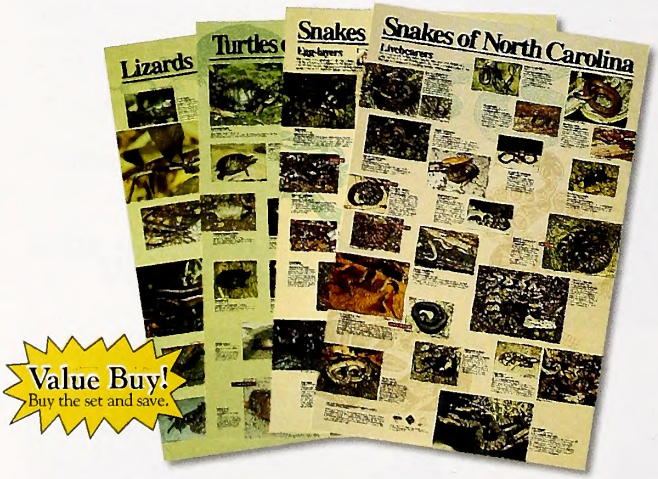
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE

White, 100% cotton (preshrunk) T-shirts are guaranteed for comfort and durability. Each shirt features an original design.

N.C. WILD T-SHIRT
N.C. WILD logo printed on front and colorful art on back. $14.50.
ITEM CODES:
A4MED (medium)
A4LRG (large)
A4XLG (extra large)
A4XXL (extra extra large)

WILDLIFE IN N.C. T-SHIRT
WINC magazine logo on front pocket. Tundra swan art on back. $14.50.
ITEM CODES:
A5MED (medium)
A5LRG (large)
A5XLG (extra large)
A5XXL (extra extra large)



LIZARDS OF N.C.
Shows all 12 of the state's lizard species. 22" x 34". $6. ITEM CODE **P3**

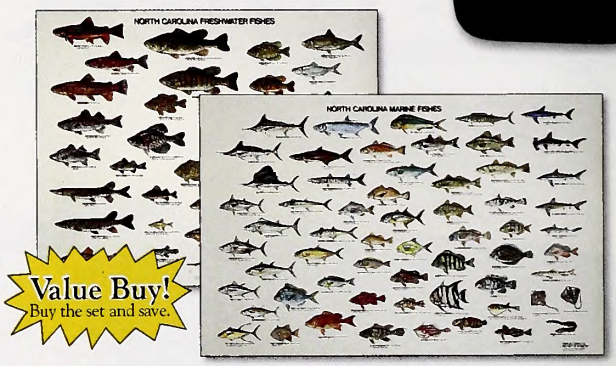
TURTLES OF N.C.
Shows all 21 of the state's turtle species. 22" x 34". $6. ITEM CODE **P4**

SNAKES OF N.C. (LIVEBEARERS)
Shows all 17 of the state's livebearing snake species. 22" x 34". $6. ITEM CODE **P5**

SNAKES OF N.C. (EGGLAYERS)
Shows all 19 of the state's egg-laying snake species. 22" x 34". $6. ITEM CODE **P8**

SET OF 4 POSTERS
You'll save $6 by purchasing the set of four posters above. $18.
ITEM CODE **P10**

N.C. WILD CAP
N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. $16.50.
ITEM CODE **A1**



N.C. FRESHWATER FISHES
Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6. ITEM CODE **P6**

N.C. MARINE FISHES
All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6. ITEM CODE **P7**

N.C. FRESHWATER FISHES AND N.C. MARINE FISHES
Save $2 when you buy both posters as a set. $10. ITEM CODE **P9**

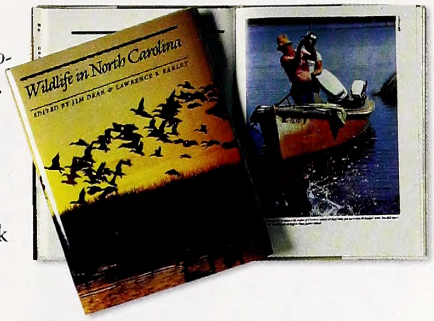
WILDLIFE IN N.C. CAP
Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with an adjustable cloth strap and buckle closure. Two-tone cap is navy/stone. $16.50.
ITEM CODE **A2**

DOGS THAT POINT, FISH THAT BITE
Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. $19.95. ITEM CODE **M8**

WILDLIFE IN N.C. CAP
Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. $16.50.
ITEM CODE **A3**

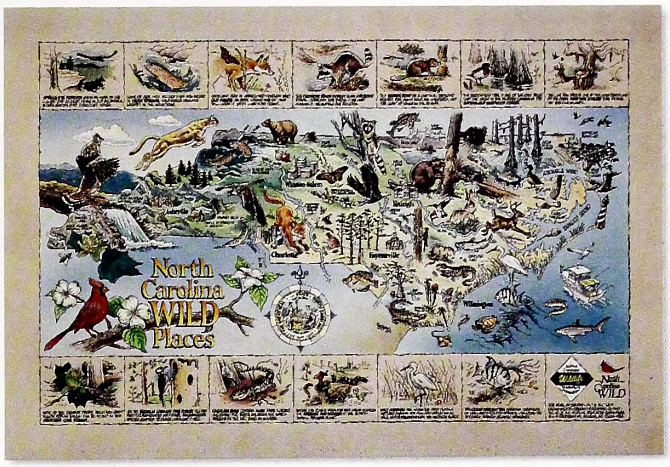
Wildlife in North Carolina Book

The best of *Wildlife in North Carolina* magazine. Hardbound. $12.
ITEM CODE M3



Magazine Binder

Store 12 issues of the magazine in this sturdy brown leather-look binder with gold lettering. $10.
ITEM CODE M2



North Carolina WILD Places Map

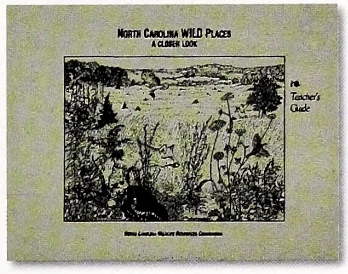
Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4

Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6

North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7



Value Buy!
Buy the set and save.

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look.* 19 1/2" x 16". Shipped folded with poster version of WILD Places Map. $8. ITEM CODE E5

North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places Book and Posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16. ITEM CODE E6

N.C. WILD Notebooks

Each set contains eight issues of *North Carolina WILD Notebook*, the Wildlife Resources Commission's prize-winning conservation education newsletter.
$3 per set.

1995-1996 Set ITEM CODE E11
1996-1997 Set ITEM CODE E12

North Carolina WILD Journal

Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

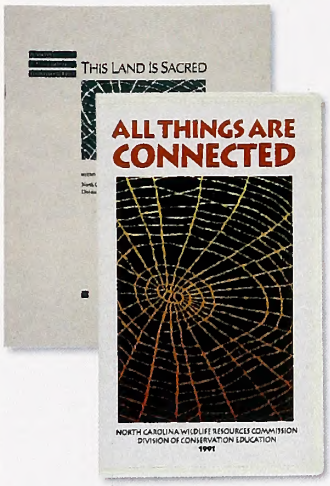
Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.
Cub & Boy Scout Correlation. ITEM CODE E9
Girl Scout Correlation. ITEM CODE E10

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.



All Things Are Connected

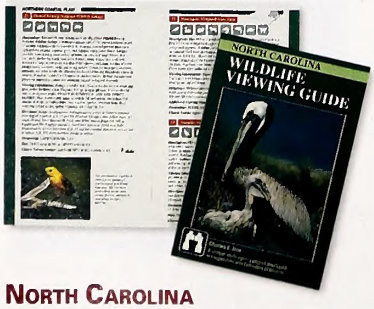
Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. $20.
ITEM CODE **W1**

This Land Is Sacred (Teacher's Guide)

Classroom activities to accompany All Things Are Connected video. $4.50. ITEM CODE **W2**

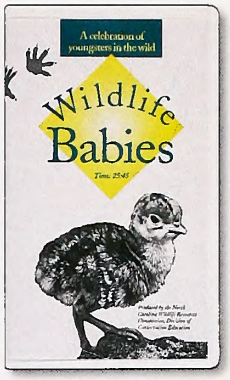
All Things Are Connected & This Land Is Sacred

Video and Teacher's Guide package. $22. ITEM CODE **W3**



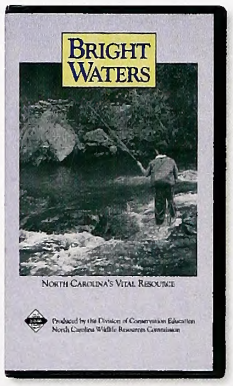
North Carolina Wildlife Viewing Guide

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95. ITEM CODE **N6**



Wildlife Babies

Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20. ITEM CODE **N9**



Bright Waters (Video)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20. ITEM CODE **N7**

Protecting Our Wildlife Heritage (Video)

25-minute video offers useful tips for landowners on managing small game. $20. ITEM CODE **N8**

Gardens for Butterflies

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2. ITEM CODE **M5**

WILDlife Profiles

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. **$2 per set.**

Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard. ITEM CODE **W4**

Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar. ITEM CODE **W5**

Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, largemouth bass, black crappie, channel bass. ITEM CODE **W6**

Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon. ITEM CODE **W7**

Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE **W8**

Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE **W9**

Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab. ITEM CODE **W10**

Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE **W11**

Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE **W12**

Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE **W13**

Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE **W14**

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (___) ___-____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____-____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

→ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
→ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
→ (N.C. residents add 6% sales tax.) ..... **TAX**	$
→ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
→ (Add all items above.) ..... **TOTAL**	$

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE

( )
Daytime Phone Number

Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

	PRICE
☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands)	$250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine	$100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age)	$200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age)	$205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age)	$350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age)	$355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.])	$500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older)	$505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.])	$1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons)	$250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (____) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

_ _

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires____/ _____ Acct. No. _____

Card Holder's Signature _____

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

MasterCard

VISA

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ _ _ _ _ _ _

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

N.C. Wildlife Endowment Fund

Sweater Weather

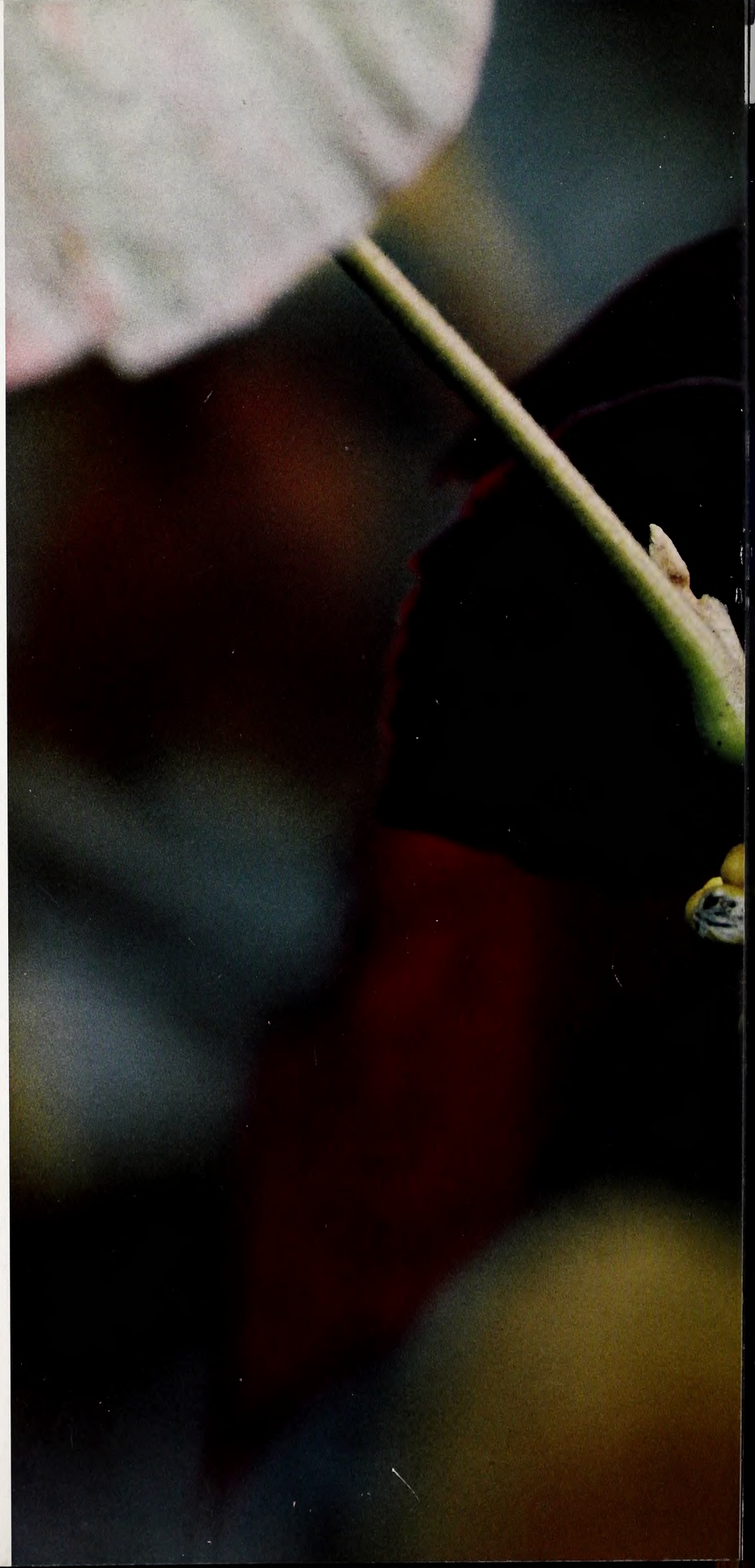
N.C. WILDLIFE RESOURCES COMMISSION

You wake up one morning and summer is history. Fall slipped in while you were busy mowing the lawn and taking the kids to the pool. You pull sweaters out of the cedar chest one by one, reluctant to admit there's no more need for shorts and T-shirts. And that flock of geese overhead signals that sensible creatures are preparing for the winter ahead.

Don't waste this fine season fretting over the upcoming holidays. Finish all your Christmas shopping at the N.C. WILD Store (on pages 37-40). There's something for everyone on your list, plus gift subscriptions to

WILDLIFE
IN NORTH CAROLINA

(See cover wrap for order form.)



Joyce Kilmer Visitor

You would expect the 3,800-acre virgin forest in western North Carolina named for the poet who wrote "Trees" to host interesting bird life like this black-throated green warbler. And it does. But the diversity of species found there has surprised ornithologists and caused them to rethink some earlier theories.

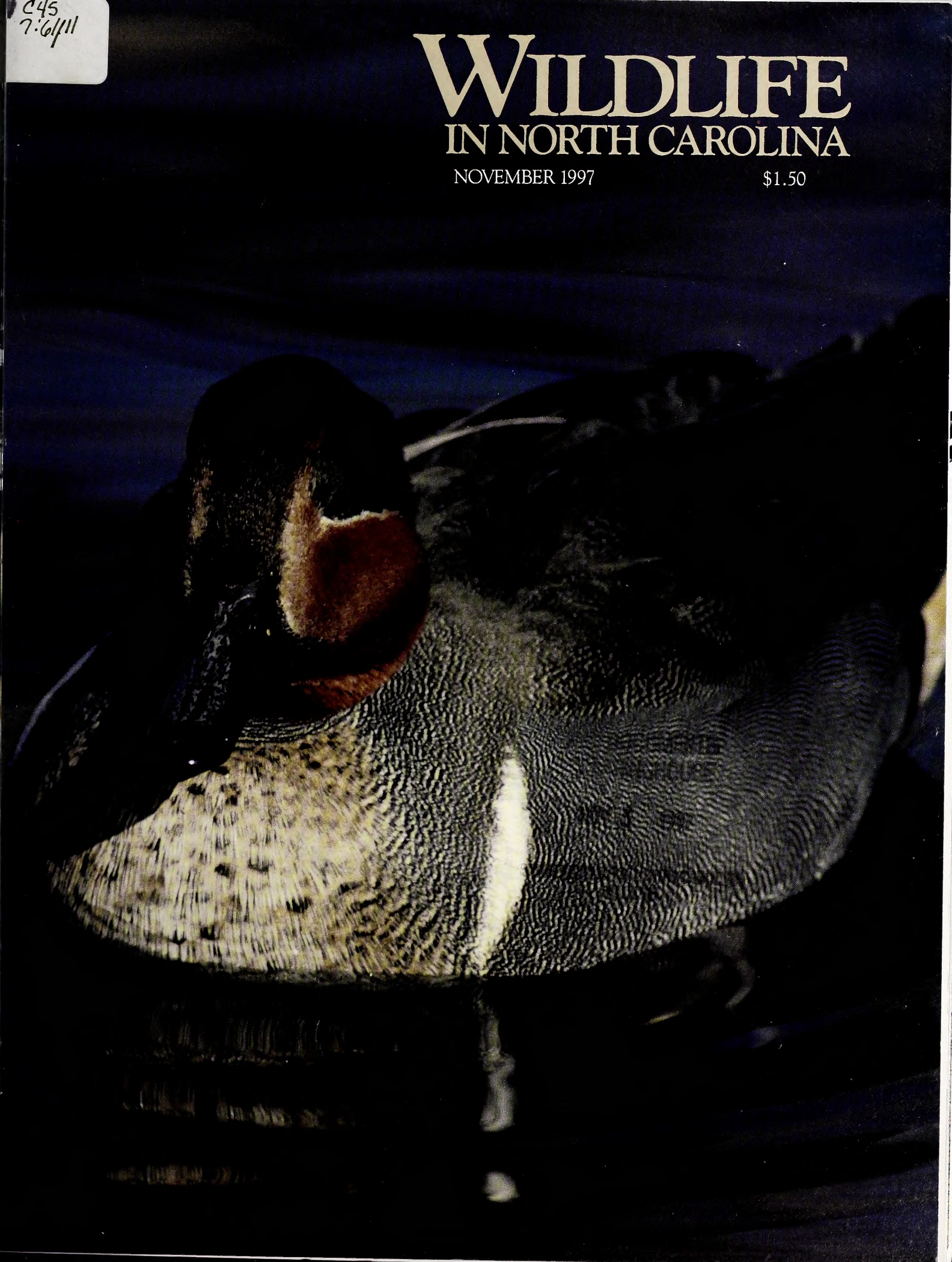
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

C45
7:61/11

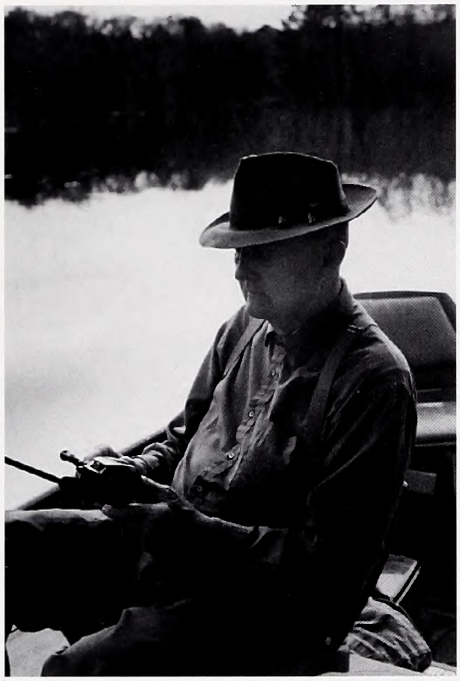
WILDLIFE IN NORTH CAROLINA

NOVEMBER 1997 $1.50



Back to Bluegill

by Jim Dean



WILLIAM G. DEAN / PHOTO BY JIM DEAN

About two years ago, Jay Wheless called me from Manteo and, after introducing himself, he shocked me with the following. "You've written about an old millpond called Bluegill where you and your grandfather used to fish," he said. "From your descriptions, it sounds like the same place my family bought some years ago."

We quickly established that it was, indeed, the same place and while I was pondering this remarkable coincidence, Jay made a generous offer. "Would you like to go back and fish there sometime?"

Of course, I said yes, thinking how wonderful it would be to see the old 33-acre pond where my grandfather, W.S. Dean, had taught me to fish when I was 8 years old. Over the winter, I spent a good bit of time thinking about a return trip and trying to decide when I had last been there. I would have certainly fished there with my grandfather the fall of 1967, but he died the following March and I could recall going back only once the following summer with my dad, William Graham Dean. Within a year or two, the property had been sold and the surrounding timber clearcut. I had heard—wrongly, as it turns out—that even the old cabin and boat house had been torn down. Over the intervening years, Bluegill and the happy, heedless summer afternoons I'd spent there had grown ever distant.

But Jay's offer was proving irresistible, calling up old memories of Sunday afternoon fishing trips, my grandfather still in his "go-to-meeting" white shirt, coat and tie and smelling faintly of fried chicken, yeast rolls and Muriel Senators (not so faintly). And I remembered the occasional bass we had caught—especially a big one he caught one brisk autumn day with his Pflueger Supreme reel, split-cane Heddon casting rod, black linen line and Creek Chub crippled minnow.

And I recalled when I was 10 years old the first big bass I'd ever hooked—big, to me, anyway, though it weighed only about 4 pounds. That fish had struck at a silver Nip-I-Diddee, and there were lots of tense moments as I played it through a stump garden until I got it alongside the boat. I can still see it lying on its side in the dark water, see my grandfather reaching out with the landing net, and see the small bead swivel that simply, inexplicably, pulled apart. And I can see that bass drifting slowly down in the dark water—still unaware that it was free—until my silver Nip-I-Diddee was just a glimmer.

"It was all a dreamy, skewed vision of what I remembered —the reality somehow less tangible than the memory."

So this past year I looked for an opportunity to fulfill Jay's offer, and I told my father I wanted him to go—I was, you see, already sentimentally thinking of this as a three-generation reunion. One unseasonably warm day last March, Dad and I drove the familiar 15 miles from his home, covering the last few miles down the gravel road to the gate. One hundred yards farther, we crested the ridge and saw the cabin and boathouse with the lake beyond, dark and inviting—just as they had been, or nearly so. We looked around for awhile, sharing recollections. I stuck my grandfather's old felt fishing hat on Dad's head and took his picture, then we went fishing. We caught a few bass. Dad hooked one that gulped his floating lure right beside the boat in hot mid-afternoon while he was picking out a backlash. And somehow I chanced to catch a 4-pounder just before dark. Symbolically, it was the perfect match for that bass I'd lost 47 years ago, yet something was missing.

Though much was the same, much was different. The countless familiar stumps throughout the pond had long since rotted away, the dam had been rebuilt, the trees hadn't fully regrown and everything looked somehow smaller. It was all a dreamy, skewed vision of what I remembered—the reality somehow less tangible than the memory. And now that months have passed, I am aware of something else. What I saw in March has overprinted some of the older memories I had of this place so that I can no longer recall exactly how things looked all those years ago.

That was a risk I had anticipated. After all, I have steadfastly refused to visit the houses I grew up in because I want to remember them precisely as they were when I lived there. As for Bluegill, it will always be one of my favorite places on earth. But the Bluegill where Dad and I spent a fine and very enjoyable day this past spring belongs to Jay and his family and their more recent memories. It is in good hands, surely, but my grandfather wasn't there that day.

He and Dad and a pimply kid are in an old wooden skiff among long-gone stumps where there is a bass with my silver lure in its mouth.

To readers: I am retiring this month; however, I will continue to write this column awhile longer if the fish let me. Thanks for your friendship over the years.

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Wayne McDevitt/Secretary

North Carolina Wildlife Resources Commission

Jim Bennett/Chairman/Greensboro
John E. Pechmann/Vice-Chairman/Fayetteville
C. J. Belch Jr./Roper
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
John Coley/Holly Springs
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John F. Lentz/Ellerbe
Joe Long/Mocksville
Charles R. Preston/Conover
Eugene Price/Goldsboro
Wes Seegars/Goldsboro
Bobby N. Setzer/Cullowhee
W. Ray White/Manteo
Arthur J. Williams, III/Washington

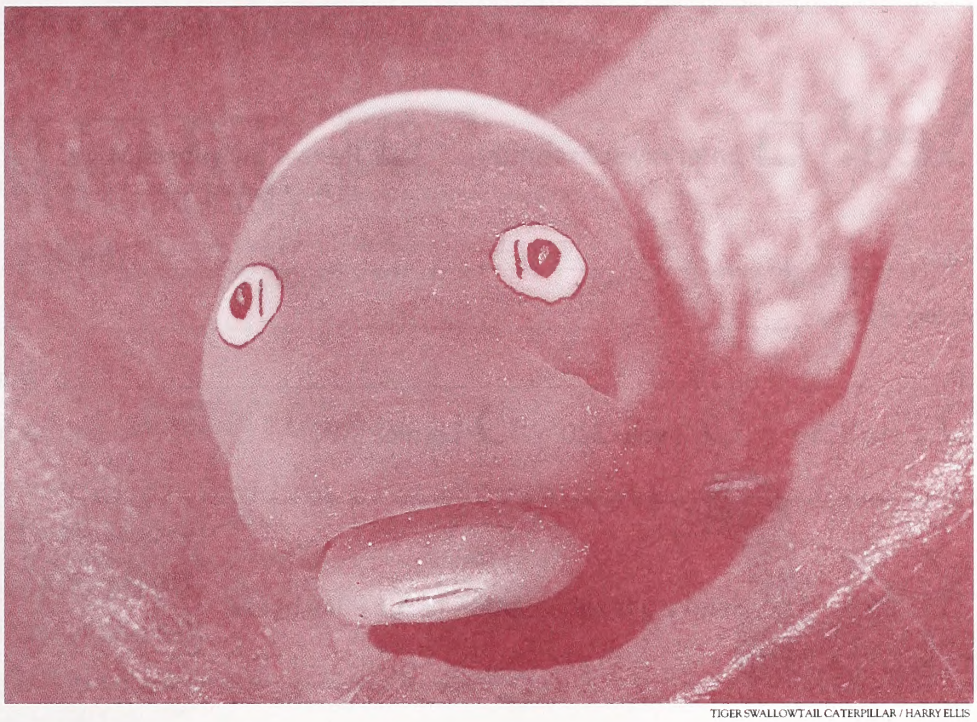
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education
Gordon S. Myers/Engineering Services

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Kimberly K.C. Schott/Interim Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants



TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, there's a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS ☞

MAGAZINE SUBSCRIPTION ORDER FORM

FW97-98

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.**
(If renewal, attach recent magazine label.)

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
first name MI last name area code

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** $

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription From _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip _____

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** $

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** $

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE ( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

Contents

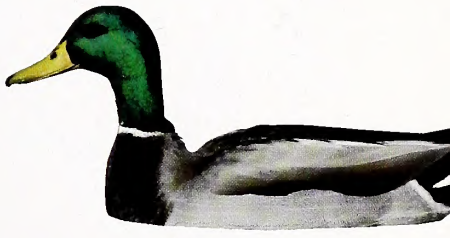
Wildlife in North Carolina

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

November 1997 *Volume 61, Number 11*

Features

4 **Paper Ducks?** *written by Dennis Luszcz*
photographed by F. Eugene Hester ©1997
The reported resurgence of the duck population isn't some cruel hoax. Those ducks are real, even if they didn't show up in North Carolina as promised last year.


page 4

8 **How Big Is That Rack?** *written by Gerald A. Almy* ©1997
photographed by Bill Lea ©1997
Forget taking the tape measure to the field. Here's how to size up the rack on that trophy buck before you squeeze the trigger.

page 12

12 **Skull Sessions** *written by Mary Kay Clark* ©1997
photographed by Melissa McGaw
The features of a skull reveal a lot about an animal's needs and habits.

18 **Big Tom Wilson** *written by Tim Silver* ©1997
When Big Tom Wilson led searchers to the body of Elisha Mitchell in 1857, he cemented his reputation as North Carolina's most famous mountain man.

page 18

24 **Bear 187, Where Are You?** *written by Roger Powell* ©1997
Tracking with telemetry helps biologists learn about black bear home ranges and the kinds of habitat they need to survive in North Carolina.

Departments

Our Natural Heritage *by Jim Dean* ..... **inside cover**
Nature's Ways *by Lawrence S. Earley* 2
N.C. WILD Notebook *by Consie Powell* 28
Back Porch *by Rodney Foushee* 32
Wildlife Through the Year *by Rodney Foushee* 36

page 28

Cover *The drake green-winged teal is a handsome duck, and one of the species that is prospering. Photographed by F. Eugene Hester.* ©1997

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

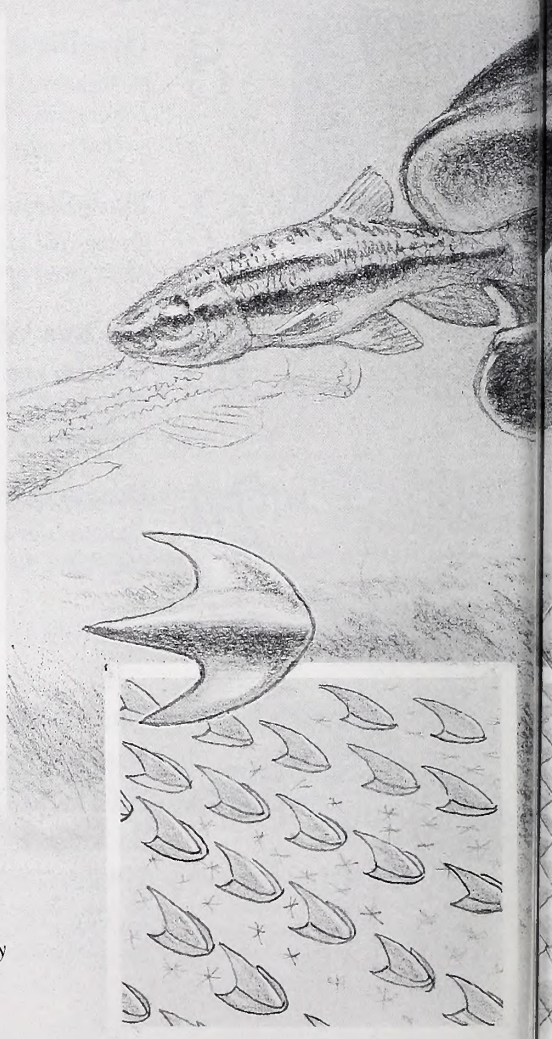
The Tales That Scales Tell

written by Lawrence S. Earley
illustrated by David Williams

There's nothing more fishy than fish scales, and hardly anything more important to most fish. Scales are a fish's body covering, its protective armor. Scales give many fish their characteristic feel—smooth in one direction and rough in the other. This peculiar feel comes from the way the scales overlap each other, contributing to the fish's overall streamlining.

Of course not all fish scales are alike. They differ depending on the particular life style of the species and its evolutionary history. Fish seem to have evolved in the direction of lighter and finer scales. Primitive fish like gars have heavy, plate-like scales; more advanced fish like trout and herring have lighter and more flexible scales. Some fish species lack scales entirely or they are tiny and buried deep in the skin. Catfish, eels and ocean-swimming fish such as swordfish fall into this category.

***Biologists can tell how** old a fish is by examining the annual marks—called "annuli"—on one of its scales. Like the annual rings of trees, a single concentric circle is deposited each year, providing a fairly accurate way to age a fish.*



***Sharks have a** distinctive and very primitive scale called a* placoid *scale. They are a lot like teeth. Sharks' scales are quite small and contribute to the sandpaper texture of their skin.*

Other Reading

- Peter Moyle, Fishes: *An Enthusiast's Guide* (Univ. of California Press, 1993).
- E.D. Ommanney, *The Fishes* (Life Nature Library: Time Inc., 1963).
- Steve Parker, *Fish* (Eyewitness Books: Alfred A. Knopf, 1990).

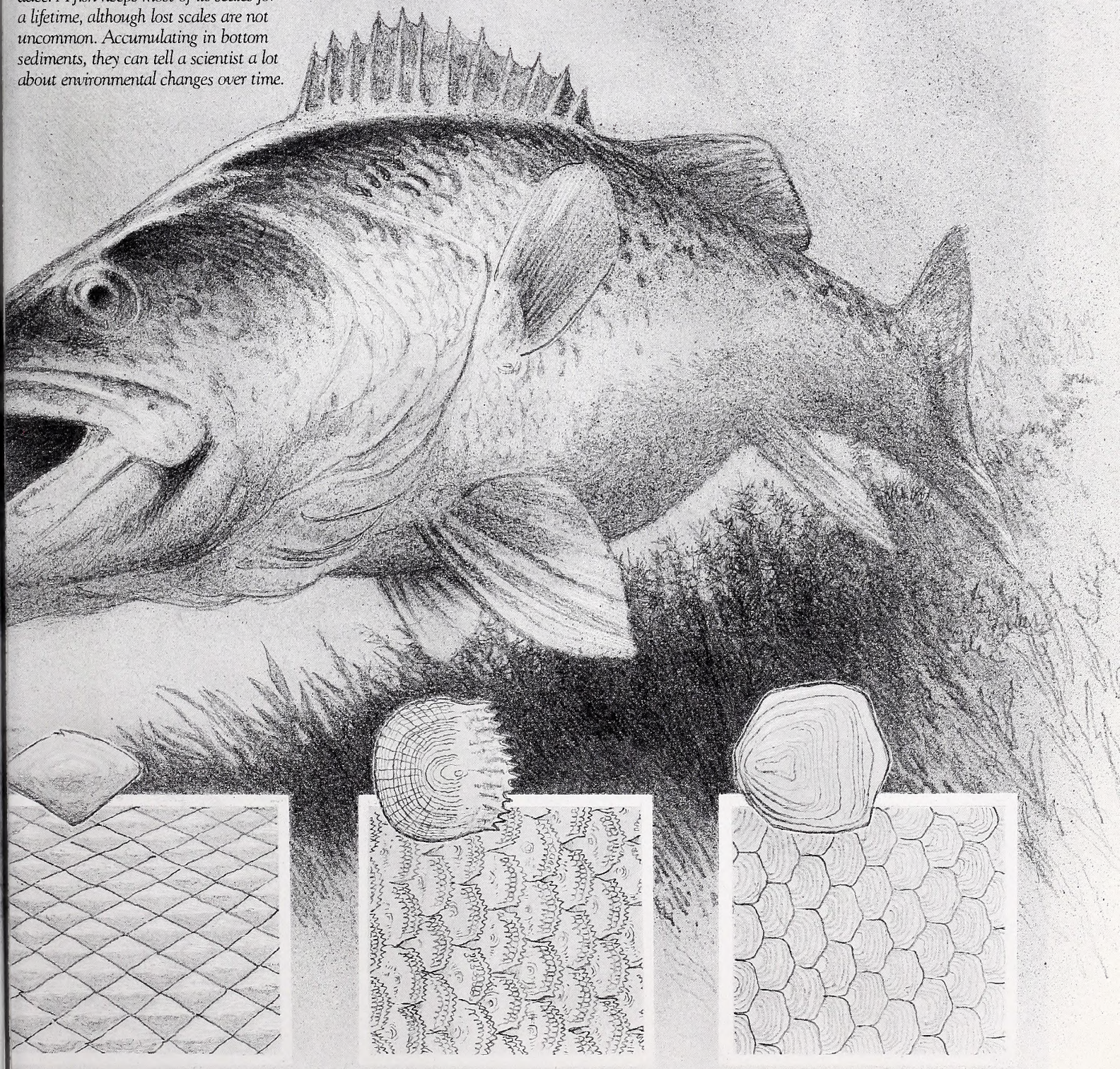
Surfing the Web

- The web site at the Birch Aquarium at Scripps Institution of Oceanography, University of California, San Diego, contains more information about fish scales. "A Fishy Tale" discusses how scientists use fish scales as records of environmental change. *Address*: http://aqua.ucsd.edu/nextwave/a_fishy_tale.html

Fish Facts

- Fish scales are an ingredient in lipstick!
- Fish scales are bones. Reptile scales are hardened skin.

The scales of a *predator flash brightly in the water as it goes after a swimming dace. A fish keeps most of its scales for a lifetime, although lost scales are not uncommon. Accumulating in bottom sediments, they can tell a scientist a lot about environmental changes over time.*



Gars, sturgeon, paddlefish *and other slow-moving fish are equipped with heavy, bony plates called* ganoid *scales. These plates are like nearly impenetrable armor. Such heavy scales are characteristics of primitive fish.*

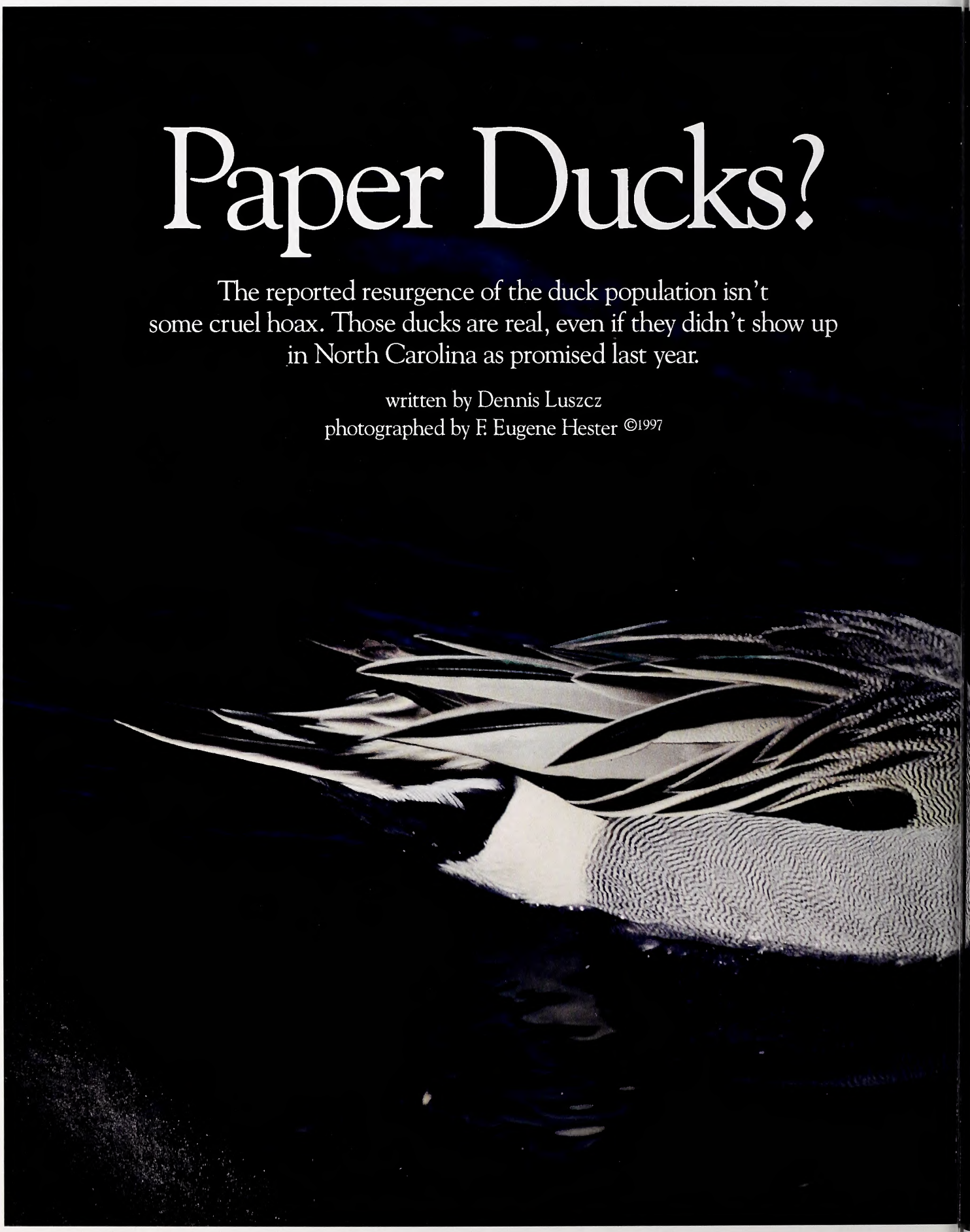
Bluegills and other *sunfish have light and flexible scales that enable them to move more quickly in slow-moving waters than gars and sturgeon. These overlapping* ctenoid *scales are raised on one edge, giving them a coarse feel.*

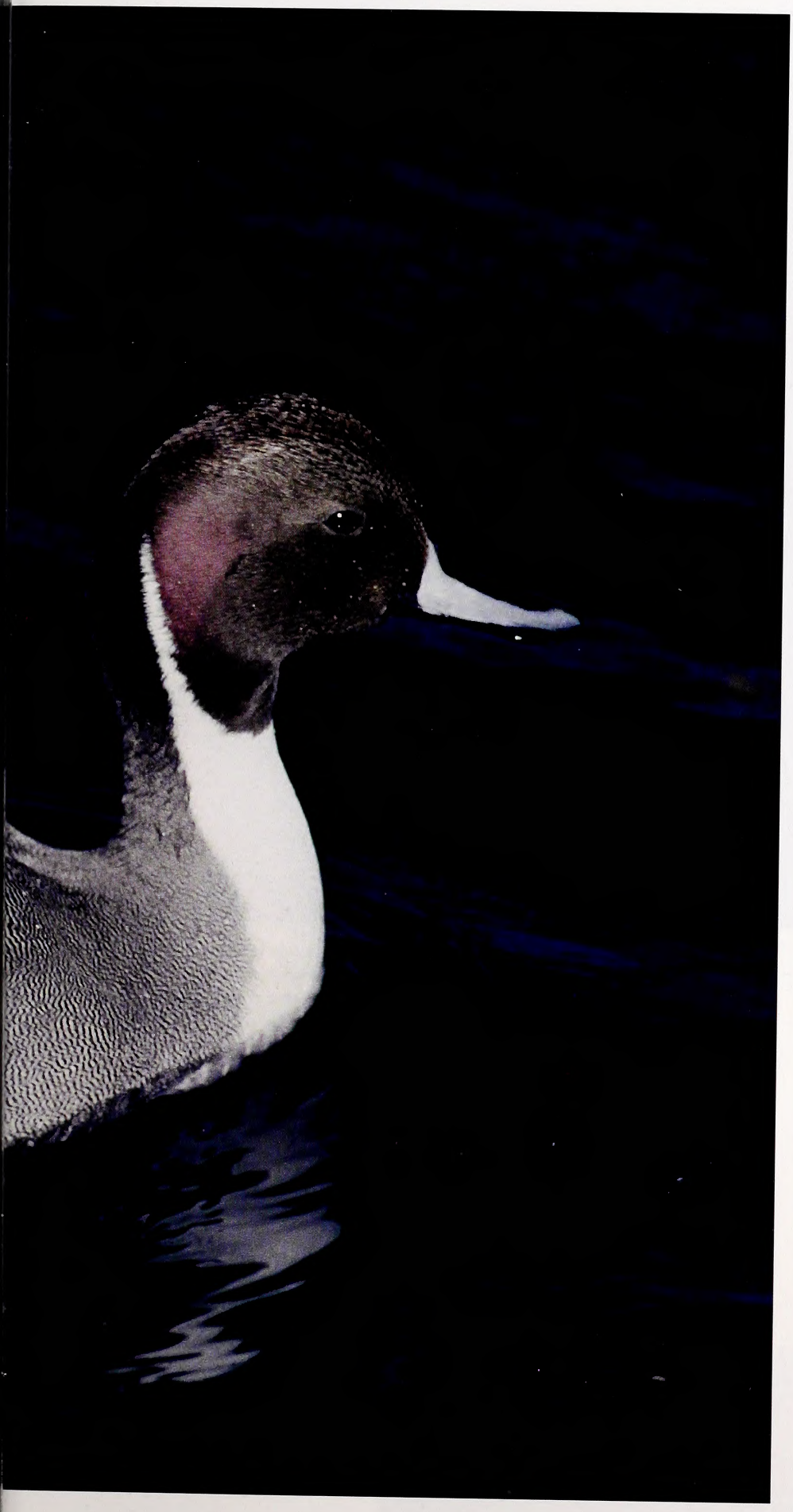
The fastest swimmers—*herring, trout and minnows—have* cycloid *scales, the lightest and most flexible of scales. These fish often inhabit fast-moving waters where speed is important.*

Paper Ducks?

The reported resurgence of the duck population isn't some cruel hoax. Those ducks are real, even if they didn't show up in North Carolina as promised last year.

written by Dennis Luszcz
photographed by F. Eugene Hester ©1997





The average North Carolina duck hunter, like many of his peers across the continent, went into the field last year filled with anticipation. Glowing reports from the breeding grounds indicated that near-record numbers of ducks would be winging their way southward.

Hunters had reasons to be optimistic. Nearly a decade of drought in the North American prairies has finally come to an end, and the last four years have been some of the wettest on record. The grassland nesting cover, burned and disked during the dry years to increase crop acreage, is once again too wet in spring to farm and is increasing in abundance. Such conservation programs as the North American Waterfowl Management Plan, the Conservation Reserve Program and Prairie Care have contributed to the improvement of habitat, along with the work of wildlife agencies, private landowners and conservation groups such as Ducks Unlimited. Annual surveys indicate that duck breeding populations are up. Furthermore, during the 1995 season, hunting had been good after many slim years. Expectations for the 1996 season were high.

But by the end of December, it began to look obvious that this was not to be. The month of November had been unseasonably cool, with good numbers of ducks reported in coastal North Carolina through mid-month—not surprising, since duck numbers can be excellent during November as early migrations of pintail, wigeon and other species arrive in coastal marshes, and wood duck numbers peak statewide. By Thanksgiving, however, those birds began to leave, and the new birds usually expected in December never seemed to arrive.

"Where are the ducks?" asked callers. Many indicated that friends in other eastern states were asking the same question. In an attempt to come up with some answers, I talked to fellow waterfowl biologists in other Atlantic Flyway states. None confessed to being overrun with ducks. Soon there were rumors that the fall flight was composed of

***The Carolinas have** traditionally been wintering grounds for Atlantic Flyway pintails (left), but the population of these handsome ducks is still cause for concern despite a resurgence in some species. Pintails and mallards (in flight, above) are traditional favorites among waterfowlers.*

***Despite the prediction** that more ducks would show up last year, hunters frequently set out decoys and waited under duckless skies, leading some sportsmen to doubt the population figures released by the U.S. Fish and Wildlife Service.*

"paper" ducks, suggesting that the breeding surveys were wrong, or that the resurgence in the duck population was being intentionally misrepresented. It didn't help when *Field & Stream*'s conservation editor attacked the U.S. Fish and Wildlife Service, suggesting that management programs were seriously flawed and that the service was deceiving the public. Delta Waterfowl, a recognized waterfowl research and conservation organization, issued concerns that duck populations were not doing as well as thought. One caller even remarked to me that he had heard that all the ducks were in Laurel, Md., a facetious reference to the office location of many of the federal biologists who coordinate the surveys.

Where, in fact, were the ducks? The possibility that the resurgence of ducks might be a "paper" revival—a malicious, self-serving hoax, as rumored—seems highly unlikely given the sincere dedication of so many biologists to the resource. To have so many biologists agree to such a conspiracy is unthinkable. I began to look at the facts.

I knew from experience that summarizing statewide hunting success or game abundance over an entire waterfowl season, or several seasons, is a tricky affair. I have asked duck hunters who hunted within a few miles of each other to describe their hunting season and have received as many different answers as there were hunters. Depending on the memories of sportsmen, comparing the success of recent hunting seasons to past seasons is even less reliable. Hunters, myself included, tend to selectively remember the good times and downplay the bad days. A mail survey from a relatively large, random sample of hunters is a much better guide, but, unfortunately, one has not been done recently.

The well-established, long-term annual harvest surveys and surveys of duck populations—including the much-maligned breeding population surveys that are conducted every summer in the United States and Canada—conducted by North American wildlife agencies remain the best tools for measuring the changes in continental duck populations for most species.

These surveys are useful to waterfowl managers as long as the shortcomings of each are considered, and they have proven to be reliable indicators of duck status ever since they were first conducted in 1955. New surveys have come on line in the last eight years that will give us an even better handle on eastern stocks of birds important to the Atlantic Flyway and to North Carolina. These are currently being integrated into the regulation-setting process. These surveys, however, cannot predict how many ducks will come to any particular state, or what kind of hunting success can be expected. If the birds come to

your particular area, and weather and habitat conditions are right, you may have a good hunt or season. In the past season several of these factors didn't pan out in North Carolina and several other eastern states. Weather during most of the winter was mild, which slowed duck movement. The ducks were not stressed, so they weren't forced to feed heavily. Water was abundant in most habitats, and there was minimal ice, so there was ample open water to disperse ducks over wide areas. In eastern North Carolina, heavy winds and prolonged flooding associated with two hurricanes were believed to have damaged aquatic vegetation in many habitats, making those places less attractive to ducks.

This season, the breeding population surveys are again predicting an increase. In fact, the fall flight is predicted to be about 92 million ducks. These figures tend to support the relatively high numbers reported in 1996. Some annual error and variation are always expected to occur in a survey of this type due to observer error, visibility and other factors, but the survey results are not inconsistent with previous years, and they show an upward trend.

Another factor that shouldn't be ignored is the impression of the many trained observers who conduct the surveys. Many of these biologists have been conducting aerial and ground counts of ducks, as part of the breeding surveys, for 25 years or more. Some were conducting surveys during the last good duck years of the 1970s, and these biologists say that today's population is the highest they have ever seen.

But what about last year's hunting season? To get a better picture, I first examined the midwinter waterfowl survey results. This survey is a coordinated aerial count of waterfowl conducted in the Atlantic Flyway during the first half of January of each year. Were duck numbers down in the flyway last winter compared to 1996? The survey did indicate a decrease of slightly over 5 percent, although a change this small would be insignificant to a statistician. Indeed, this decrease was the result of fewer puddle ducks and sea ducks being counted by the survey. In North Carolina, however, the difference was greater. Compared to January 1996, the count of ducks declined a whopping 57 percent in 1997, from 276,000 to 119,000—a difference that would certainly have influenced hunting results. Harvest surveys showed similar patterns. Throughout the Atlantic Flyway, the duck harvest declined about 6 percent from the previous year, but in North Carolina, it declined 14 percent. Indeed, the duck harvest in nine of 17 Atlantic Flyway states declined last year from the previous season. Elsewhere, the decline was not nearly so sharp, and some states recorded sizable increases in duck harvest. It helps to consider also that the duck harvest nationally was estimated to have increased by about 7 percent. It seems, therefore, that we in North Carolina were victims of duck distribution rather than an overall shortage of ducks.

In North Carolina, changes have undoubtedly occurred in the species of ducks we harvest. It comes as a surprise to many people that the duck we shoot in greatest numbers is one that hardly shows up in aerial surveys —the wood duck. In some years this duck, available in every county, has accounted for nearly half of the ducks taken by hunters across the state. For that reason, the three to four days typically hunted in early October are far and away the most productive of any days during the season in numbers of ducks killed.

Mallards usually follow well behind wood ducks and approach woodies in harvest only during extremely cold winters such as those that occurred in the late 1970s. Black duck harvests have tended to decline in recent years, probably due to restrictive regulations and reduced overall numbers. Gadwall, American wigeon and green-winged teal have been the bread-and-butter ducks of many eastern North Carolina duck hunters. The first two species have been steadily increasing, and though the wigeon population has been down, it may be making a comeback. The Carolinas have been the primary wintering states for northern pintails in the Atlantic Flyway; however, winter counts of this species have shown a downward trend in the two states for a number of years. This is of some concern, since most of these birds are coming from eastern areas that are not part of the annual breeding survey.

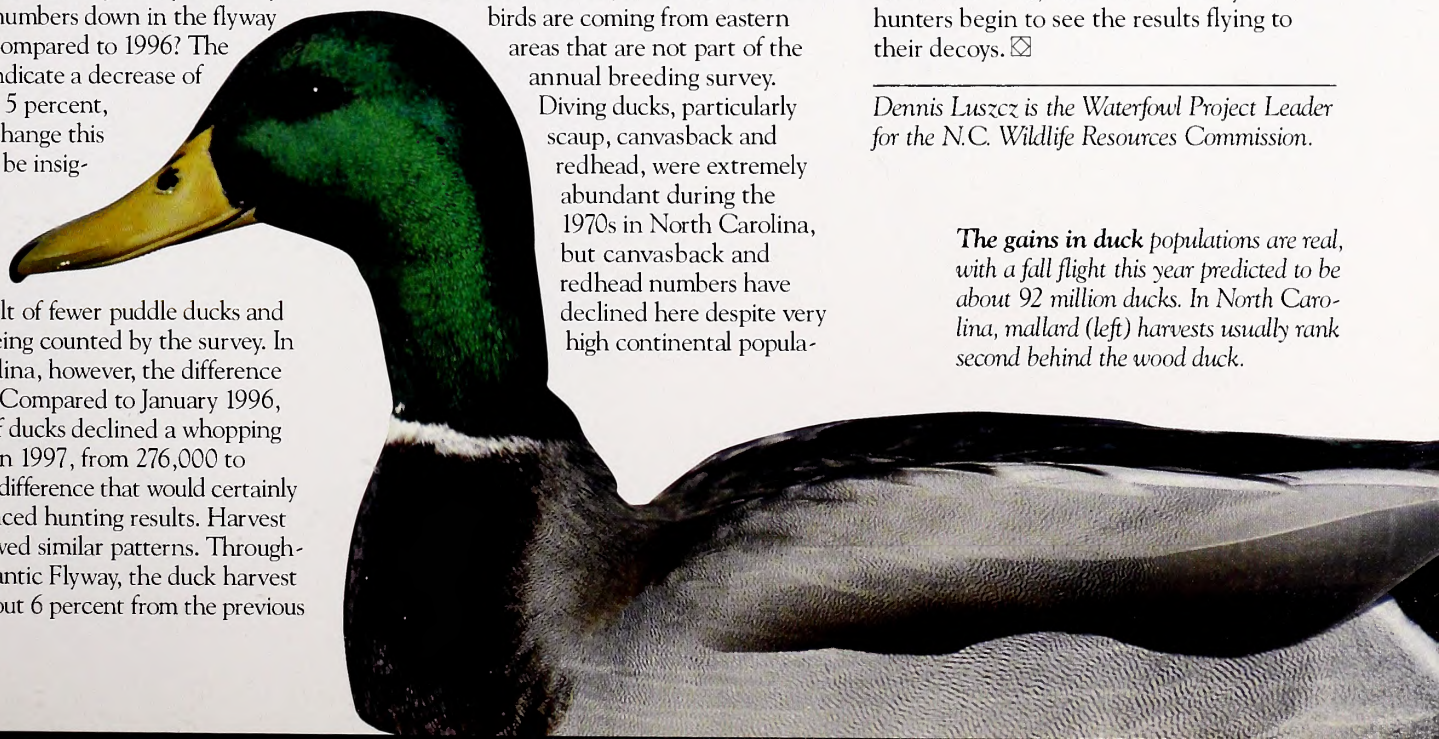
Diving ducks, particularly scaup, canvasback and redhead, were extremely abundant during the 1970s in North Carolina, but canvasback and redhead numbers have declined here despite very high continental populations. Scaup, on the other hand, do not appear to have recovered despite improved breeding habitat conditions.

I suspect that mild winters and changes in habitat here in North Carolina may largely explain the declines in several species that wintered here at peak levels during the 1970s. With the puddle ducks, particularly wigeon and gadwall, the loss of the huge beds of submerged aquatic plants in Currituck Sound, particularly Eurasian milfoil, was critical. The sound at that time was the premier waterfowl area of the eastern United States and wintered a large percentage of the Flyway's birds. Some improvement has occurred as native plants have begun to recover in areas once occupied by the nonnative milfoil. Diving ducks, on the other hand, have probably wintered elsewhere because of habitat degradation in Pamlico and Core sounds. Poor water quality due to runoff from municipal and industrial development and agriculture in the watersheds of these sounds has undoubtedly affected the aquatic vegetation and invertebrates the divers once fed on. Also in need of close scrutiny is the impact of intensive commercial fishing activity in the sounds, particularly those activities that disturb large areas of bottom sediments and increase turbidity.

Despite continuing problems, our waterfowl populations in North America are enjoying better times, and conditions should remain favorable for a few more years. The rainfall won't always be abundant, however, and we shouldn't relax our efforts to conserve breeding, migration and wintering habitat. Neither should we think that poor water quality is someone else's problem downstream. And there will always be rumors of "paper" ducks when the skies over our blinds seem empty.

But they're not paper, thank goodness. They're real, and with favorable weather and a little luck, this could be the year hunters begin to see the results flying to their decoys. ⊠

Dennis Luszcz is the Waterfowl Project Leader for the N.C. Wildlife Resources Commission.



***The gains in duck** populations are real, with a fall flight this year predicted to be about 92 million ducks. In North Carolina, mallard (left) harvests usually rank second behind the wood duck.*

How big is that RACK?

Forget taking the tape measure to the field. Here's how to size up the rack on that trophy buck before you squeeze the trigger.

written by Gerald A. Almy ©1997 / photographed by Bill Lea ©1997

To shoot or not to shoot? This is the eternal question hunters face today when they see a buck, thanks to the successful restoration of deer throughout North Carolina and much of the entire country. In years past hunters rarely faced this problem, for the question was seldom posed. If you saw a buck in season, you shot it—or shot *at* it, anyway. That still may be true for the youngster breaking into deer hunting or for the casual hunter, who goes out a couple of times a year and feels lucky just to get any legal deer—doe or buck.

For the more experienced hunter who has bagged several, maybe even dozens of bucks in the past, there is often an attitude change. This is allowed by the great abundance of deer we have today as opposed to 30 or 40 years ago.

Simply bagging a buck is not that difficult for a skilled hunter today. To add challenge to the sport and increase pride and accomplishment when the quarry is downed, many hunters are passing up small bucks. They will take a doe if they want meat but hold off on little bucks in hopes they'll grow and become trophy bucks.

But what makes a trophy? How do you judge how good a deer is in the field or in deep woods, where you might have just a matter of seconds, or at most a few minutes, to study it? How can you tell an older animal from a younger one?

There are several tricks and techniques that make this task easier than it might seem. Learning these will help you with that grueling yet sweet decision in the field—whether to let a buck walk or to squeeze the trigger or release the arrow and harvest it. I've come to realize over the years that the deer I have in my sights and let go are often just as important in my memories as the ones I take. But when the right deer comes along—when you know it for sure before you pull the trigger—and you are not surprised at what you find when you walk up to it on the ground, you'll have experienced the greatest pleasure selective deer hunting has to offer.

Before going into the factors that are used to score a buck's rack, it's important to understand a few things about what makes a trophy. Three things contribute to impressive antler growth—age, nutrition and genetics. While North Carolina deer do not have the genes to grow many world-class racks (only six Boone & Crockett bucks are currently listed for the state), they do have good enough genetics to grow antlers most hunters would consider huge. The state record Boone & Crockett deer, Terry Daffron's 181 7/8 point bagged in 1987, would be an impressive trophy anywhere in the world.

Nutrition can be a factor in preventing or allowing large antlers. In areas with high deer densities, less food is available and there's more competition for it. So more energy is devoted toward putting on body weight for survival than toward growing racks. Deer in these areas tend to have more spindly and narrower racks with fewer and shorter points.

Age is, without question, the one thing that is most important for Tar Heel bucks to grow trophy racks. Only at 3 1/2 years do bucks start to truly show the potential of their antler growth. After four or five years, the animals are even more likely to show their peak development in headgear. If they live that long, six- to eight-year-old bucks can even have outstanding racks. Generally, though, five to seven years is the peak period for antler growth, when adequate nutrition is available.

The challenge in hunting trophy deer in North Carolina is finding an old deer—one at least 3 1/2 years of age. Chances are that if you find such a deer, it will be either on a large private area managed for taking mainly does and a few older bucks, or deep in a remote area where few hunters venture.

Another point that must be made about antlers is that perspective is important. For a teenager who has bagged only a doe or a spike, a 2 1/2-year-old 8 point with a 12-inch spread is a trophy. No one would want to diminish the joy and pride of a young hunter's accomplishment.

Personal taste must also be considered. Whether you like a particular rack should be the final question you ask yourself before pulling the trigger or releasing an arrow. Some people favor wide racks, others like tall, basket-shaped ones. Some insist on lots of points, while others feel the 8-pointer is most representative of a typical whitetail trophy. Some people are excited by non-typical racks, while

***With a burgeoning** deer herd across much of the state, Tar Heel hunters are faced with a new challenge—learning to recognize and pass up younger bucks for the trophy that hides nearby.*

GERALD A. ALMY

***Putting a trophy buck** on the wall requires both the ability to size up deer in the field and the patience to pass up lesser bucks. One of the best ways to understand the qualities of a trophy rack is to study plenty of deer mounts.*

others find them odd looking. In the end, only the hunter can decide whether he or she likes the rack enough to take the animal's life.

To keep an objective record of what makes the most impressive whitetail racks, however, a scoring system is required. Several are in use, but the most widely employed and accepted is the Boone & Crockett Club's method. This rating system gives you a gross score first, by adding up various dimensions on the rack. A net score is then obtained by subtracting points where the deer is lacking in symmetry. Most hunters are interested in gross scores, because these describe exactly how much antler there is on a buck. Net scores are important, though, if you hope to get a buck in the record book. You'll need a minimum net score of 170 points to enter the all-time book, 160 to enter the latest recording period for typical deer.

A record animal is a one-in-a-million deer, but the scoring system is still valuable for rating trophies and seeing just how your deer stacks up against others. Any buck harvested with a gun in North Carolina that reaches the 120s would be considered a trophy by most sportsmen. A bow-killed deer in the 110s and up is also impressive.

What do you look for in the field? Spread is the first thing every novice hunter and even many veterans are concerned with. In reality, it's not that important in the overall score of an animal. The widest distance between the points on the outside of a buck's rack is what everyone asks about when a big deer is killed. How wide was it?

Surprisingly, this measurement doesn't even go into the score. The only spread that is included is the *inside* spread. The former top buck in the world, the Jordan buck, had an inside spread of only 20 1/8 inches, and this deer netted 206 1/8 points.

In general, a buck with an inside spread of 15 inches should be considered an excellent animal. This translates into an outside spread of 17 to 18 inches. You can judge the width of a deer's rack in the field by comparing how far the antlers extend beyond its ear tips when they are in their normal position pointing outward. This distance can vary from 14 to 17 inches but is usually right around 15 to 16. If the spread extends beyond the ears, you're looking at a nice buck. If it extends several inches, it could well be a 20-inch buck.

After spread, length of the main beam is the second item scored in the Boone & Crockett system. This is something far too few hunters pay attention to, and it's often what separates a great buck from a mediocre one. This is measured by placing a tape on the antler where it comes out of the head and measuring all the way to the tip. Both beams are measured and added to the inside spread. Eighteen inches is a very good beam length for a North Carolina deer. The Jordan buck had 30-inch main beams, the current world record; the Milo Hansen buck had 28 4/8-inch beams.

Often bucks with the longest main beams have antlers that spread outward and then sweep forward. If the main beams extend beyond a line drawn vertically to the nose, they are likely 20 inches or more. This can vary, though, according to how much curve there is in the beam as it sweeps forward.

You can use a deer's ear length to help judge main beam length. The ears typically measure about 6 inches long. Tines that are spaced far apart on the main beam also indicate good length.

The number of points is the next important item in scoring a rack, since each point is measured for length. The more points you measure, the higher the score. A typical mature whitetail usually is an 8-pointer, but a 10-pointer of the same overall caliber will always score higher. Twelve-pointers are rare, and 14-pointers are extremely rare.

The first set of points scored are those just above the head, often called the eyeguards or brow tines. These are measured for length and should be at least several inches long, preferably 4 or 5 for a superb buck. Other points should measure 6 inches, even up to 9 or more for a really high-scoring rack.

If you are concerned with net score, be aware that points are deducted from the gross score when the lengths of the tines on the two sides are different. For instance, if the third point on the left was 6 inches and the right third point was 4, you would deduct 2 points from the final net score. Using the length of the deer's ear (around 6 inches) can help you judge how long the various tines are when you look at an animal in the field.

Another thing to keep in mind when analyzing deer in the wild is broken points. Often bucks fight when the rut is approaching and break off points. An otherwise appealing trophy might lose points and aesthetic value if one or more of its points are broken off. If you decide you want to take the animal anyway, a taxidermist can repair these so they look like the original antler. Of course, you can't enter an altered animal in a contest or the record book.

Mass is a factor that seems to become more important the longer you hunt. Antler mass comes with age and good nutrition. Only deer at least 3 years old ever show much of it. The 5-year-olds are the ones that really display weight. The girth, or distance around each antler, is used to determine mass.

Circumference measurements for mass are the final ones made to score a buck. They are measured at the smallest point between the base and the first antler (G-1), and between each additional set of points. They can add appreciably to a deer's final score. There aren't many tricks for judging mass in the field. The best way to recognize this (and the other qualities discussed above) is to look at plenty of deer at taxidermy shops, outdoor shows and big-game contests. Racks with good mass simply *look* heavy and impressive.

Study the four ingredients that make up a whitetail's score—inside spread, main beam length, number and length of points, and mass—and you'll be much more adept at judging bucks in the wild. Also practice guessing the score of mounted bucks, then get out the tape and measure the dimensions of the rack to see which ones are different than you thought they were. Being selective about when you pull the trigger and studying the factors that make for a high-scoring rack add a fascinating new dimension to whitetail hunting. If a buck doesn't quite measure up, consider letting him go and taking a doe for meat. Maybe next year he'll be that trophy you've always dreamed of taking. ⊠

***Several techniques** make sizing up a buck's headgear easier than it might seem. A deer's ear length—typically 6 inches—can be used to judge the main beam and the individual points. The outspread ears can also be used to judge rack width. A nice buck has antlers that spread beyond the ear tips.*

BOONE & CROCKETT CLUB

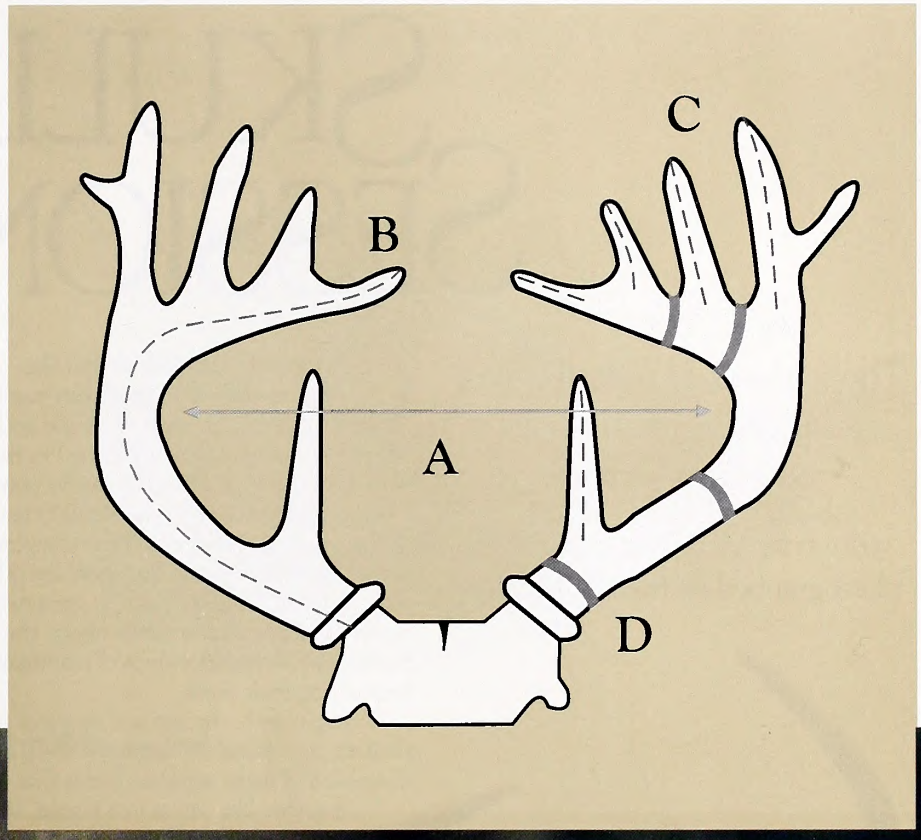
Official Scoring System

A – Inside Spread

B – Length of the Main Beam

C – Length and Number of Points

D – Girth Around Each Antler



***Understanding the** basics of the scoring system used to rate trophy whitetails can go a long way in helping a hunter select a nice buck. While inside spread (A) is important, the length of the main beams (B) often separates mediocre racks from trophies. The lengths and number of points (C) and the girth of each antler (D) also play a part in the overall scoring.*

SKULL SESSIONS

The features of a skull reveal a lot about an animal's needs and habits.

written by Mary Kay Clark ©1997
photographed by Melissa McGaw

Of the bleached bones that she brought back to her desert studio, the artist Georgia O'Keeffe said, "They are as beautiful as anything I know."

The beauty that O'Keeffe saw in bones is perfectly illustrated in the elegant curves of the whitetail's antlers and the complex architecture of his skull. But there are other reasons to take a closer look at mammal skulls. Biologists learn much about the health, age and relationships of mammals by studying their skulls.

To begin with, the size and shape of the skull are important. All mammal skulls are composed of many separate bones that fit together like pieces in a puzzle. The skull bones, as well as other general features of the mammalian skull, are relatively constant among the mammals, but the size and shape of the bones vary according to the animal's particular lifestyle.

For example, because a keen sense of smell is critical to members of the dog family (canids), they have long nasal bones that contribute to an elongated skull. Among cats, smell is not as important as it is for dogs, so their nasal bones are reduced. Cats rely on eyesight and hearing for hunting in twilight and darkness; consequently the eye sockets (orbits) and earbones in cat skulls are very large.

There are even more specific skull features to identify mammals. Biologists look for structures for muscle attachment, openings for nerves and blood vessels, and suture patterns (areas where the skull bones grow together).

But of all identifying features, the teeth have the most to say about a mammal and its lifestyle. Their number is important, but so are their shape and their location in the jaws. Certain types of teeth may be absent in one species, but present in another. All are important indicators of the animal's eating habits and are crucial for identifying the species.

There are four basic types of teeth: incisors, canines, premolars and molars. **Incisors** are the front teeth. They have sharp edges for cutting and generally are simple in structure, but are modified in many mammals for grooming, cropping, cutting and other functions.

Canines are the conical, pointed teeth located between the incisors and the first premolars—they grip and tear food and are the "stabbing teeth" in some carnivores. The tusks found in many mammals are usually modified canines. Some mammals lack canines (particularly herbivores—rodents, horses and deer) and have a gap between the incisors and premolars.

Premolars, or bicuspids, have two conical points and follow the canines. They are also used for gripping and tearing.

Molars are the back teeth, and they vary in surface shape depending on the lifestyle of the mammal. Mammals that grind food have flat molars, while those that cut food have serrated ones. These are generally the most elaborate teeth in the dentition, and they are extremely variable in pattern.

Why do mammals have so many different kinds of teeth? Because the diets of mammals are diverse, and different types of teeth are needed to process the various foods that mammals eat. Biologists reduce the number, type and location of a mammal's teeth to a "dental formula." For instance, here's what the dental formula of an opposum, the only North American land mammal with 50 teeth, looks like.

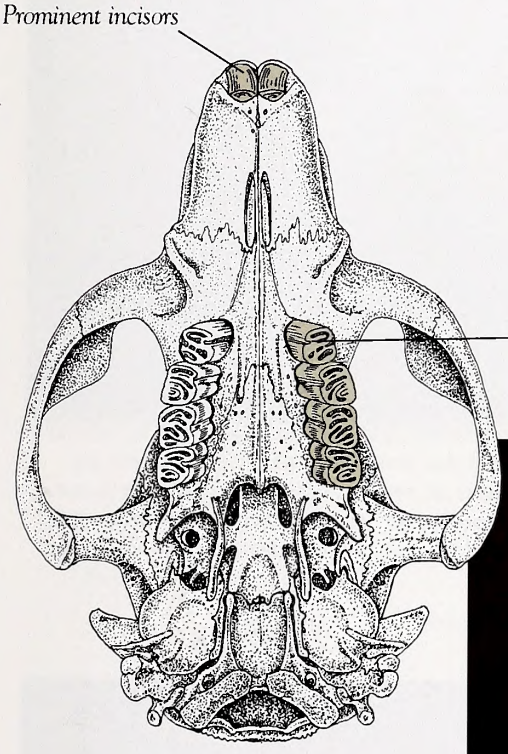
$$I\,\frac{10}{8}\ C\,\frac{2}{2}\ P\,\frac{6}{6}\ M\,\frac{8}{8} = \frac{26}{24}$$

or 50 total teeth

The letters refer to the different kinds of teeth: incisors (I), canines (C), etc. The numbers refer to the total number of teeth of each kind in both the upper and lower jaws. For example, the formula above shows that the opossum has six premolars (P) on each of its upper and lower jaws (12 altogether) and eight molars (M) on each jaw (16 altogether).

Mammals can be divided into three groups based on their feeding habits—herbivores (plant eaters), carnivores (meat eaters) and omnivores (plant and meat eaters). In the following pages try to discover what makes them herbivores, carnivores or omnivores. The answer, you'll find, lies in their teeth.

Herbivores, such as the white-tailed deer and the beaver, must chew their food well before swallowing, since plant material is difficult to digest chemically. Generally, herbivores' cheek teeth (premolars and molars) are broad and flat to grind plant material to a pulp. Most herbivores don't have canines because they don't need to grab moving prey. In deer, beaver and other herbivores, the back of the lower jawbone (mandible) is wide and deep, providing a large area to anchor the strong chewing muscles.

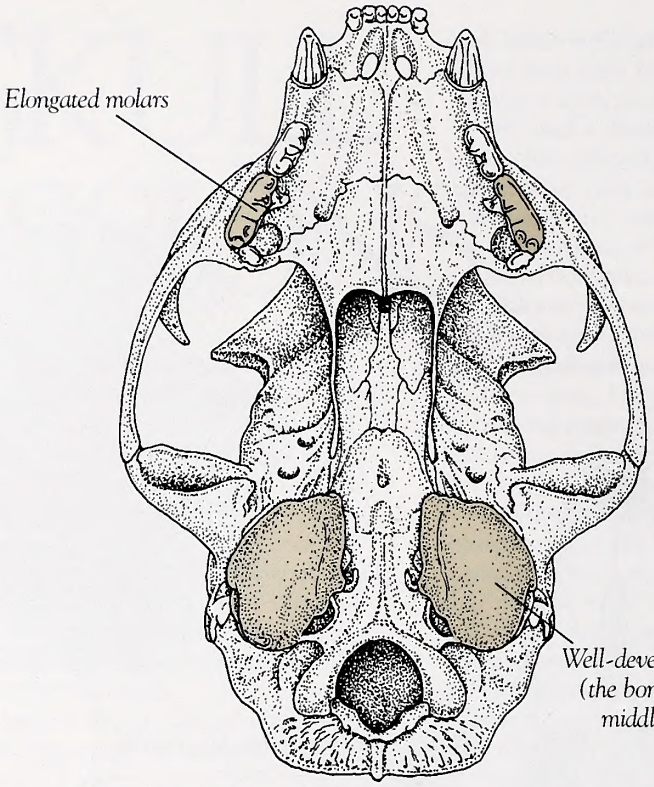


The beaver, *like other members of the rodent family, has very long, chisel-like front teeth in the upper and lower jaw for gnawing. The teeth are deeply rooted in a dense, robust skull that provides a strong foundation for the teeth. The skull must be rugged to withstand the physical stress of cutting and chipping hardwoods like oaks. The large, sharp incisors continually grow, otherwise they would quickly wear down from constant use. The incisors are sharpened by grinding the uppers against the lowers. Since beavers eat hard food such as twigs, chip the bark from trees, and chew through smaller trees to create short pieces for their dams and lodges, they also need large areas for muscle attachment. The molars are designed for grinding.*

$$I\frac{2}{2}\ C\frac{0}{0}\ P\frac{2}{2}\ M\frac{6}{6} = \frac{10}{10}$$

or 20 total teeth

Carnivores, such as bobcats and otters, have thick, heavy jaws with large surface areas and other features (such as a crest on the top of the head) for muscle attachment. Muscles are needed for the powerful, gripping bite that meat eaters need for grabbing and holding prey. In general, the teeth are pointed and sharp for catching and killing prey and for slicing and shearing meat. Cheek teeth are not as complex as in herbivores; less chewing is required because meat is easier to digest than plants. In true carnivores the cheek teeth are modified into sharp, shearing teeth called carnassials.

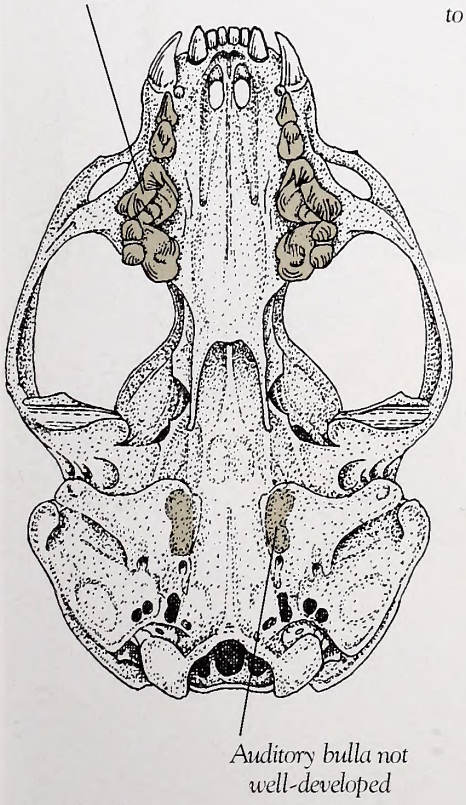


***Bobcats, like all members** of the cat family (felids), are true carnivores. Felids have a short-faced appearance, resulting from reduced nasal cavities, and a shortened jaw. Bobcats rely on their sight and hearing when hunting. The bones that protect the middle and inner ear are well-developed and prominent orbits (eye sockets) are present because cats often hunt in twilight and in darkness. The first molars and premolars are specialized teeth, called carnassials, that are designed for gripping and tearing. The skulls of members of the cat family all have a high, rounded appearance.*

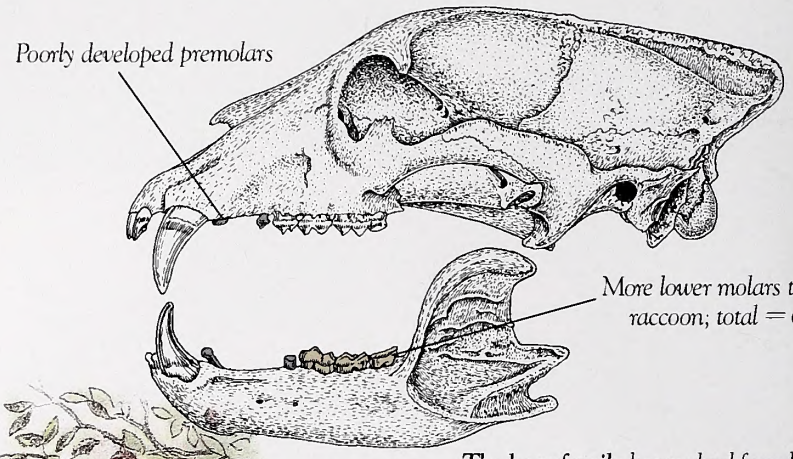
$$I\frac{6}{6}\ C\frac{2}{2}\ P\frac{4}{4}\ M\frac{2}{2} = \frac{14}{14}$$ *or 28 total teeth*

The otter, a member of the mustelid family *(weasels and allies), is also a true carnivore with well-developed carnassials. The long and flattened shape of the skull is much different from the bobcat's high, round skull, and the otter's skull is much denser. This amphibious mammal catches frogs, crayfish, crabs and fish and consumes them immediately, crushing bones and hard exoskeletons with sharp teeth and strong jaws. The flattened shape of the skull contributes to the streamlined shape of the otter, a body plan that makes it an efficient swimmer.*

$$I\frac{6}{6}\ C\frac{2}{2}\ P\frac{8}{6}\ M\frac{2}{4} = \frac{18}{18}$$ *or 36 total teeth*



Omnivores eat both plant and animal food, and their dentition and other skull characteristics exhibit a combination of features of herbivores and carnivores. In order to handle such a varied diet, they usually have the full complement of teeth (incisors, canines, premolars and molars), but their jaws and teeth are generally less specialized than those of carnivores or herbivores.



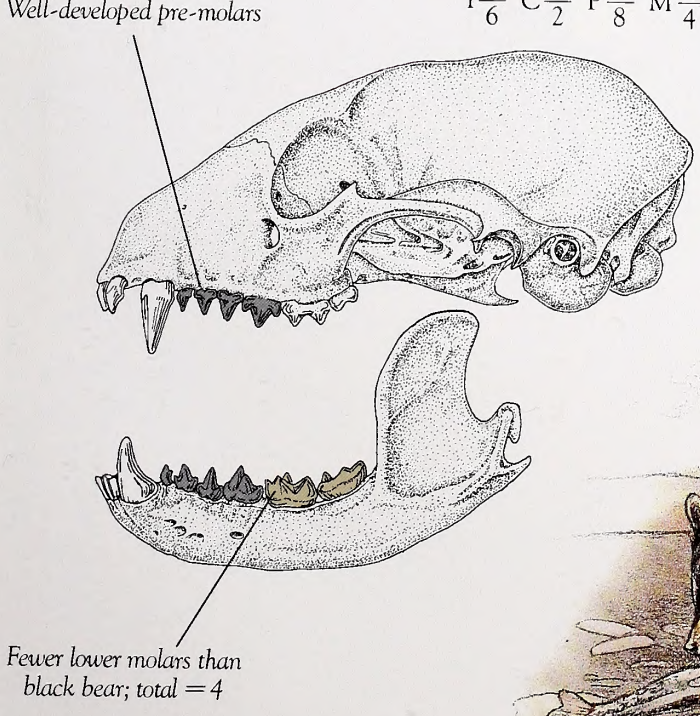
The bear family *has evolved from being chiefly carnivorous to omnivorous. Black bears feed on almost any succulent vegetation and also on grubs, carrion, fish and other small animals. They have incisors that are unspecialized, and the canines are long, as they are in true carnivores. The premolars are not well-developed and the molars are designed for crushing plant matter. Bears have a massive skull with a long rostrum (nasal area) similar to that seen in the dog family.*

$$I\frac{6}{6}\ C\frac{2}{2}\ P\frac{8}{8}\ M\frac{4}{6} = \frac{20}{22}$$

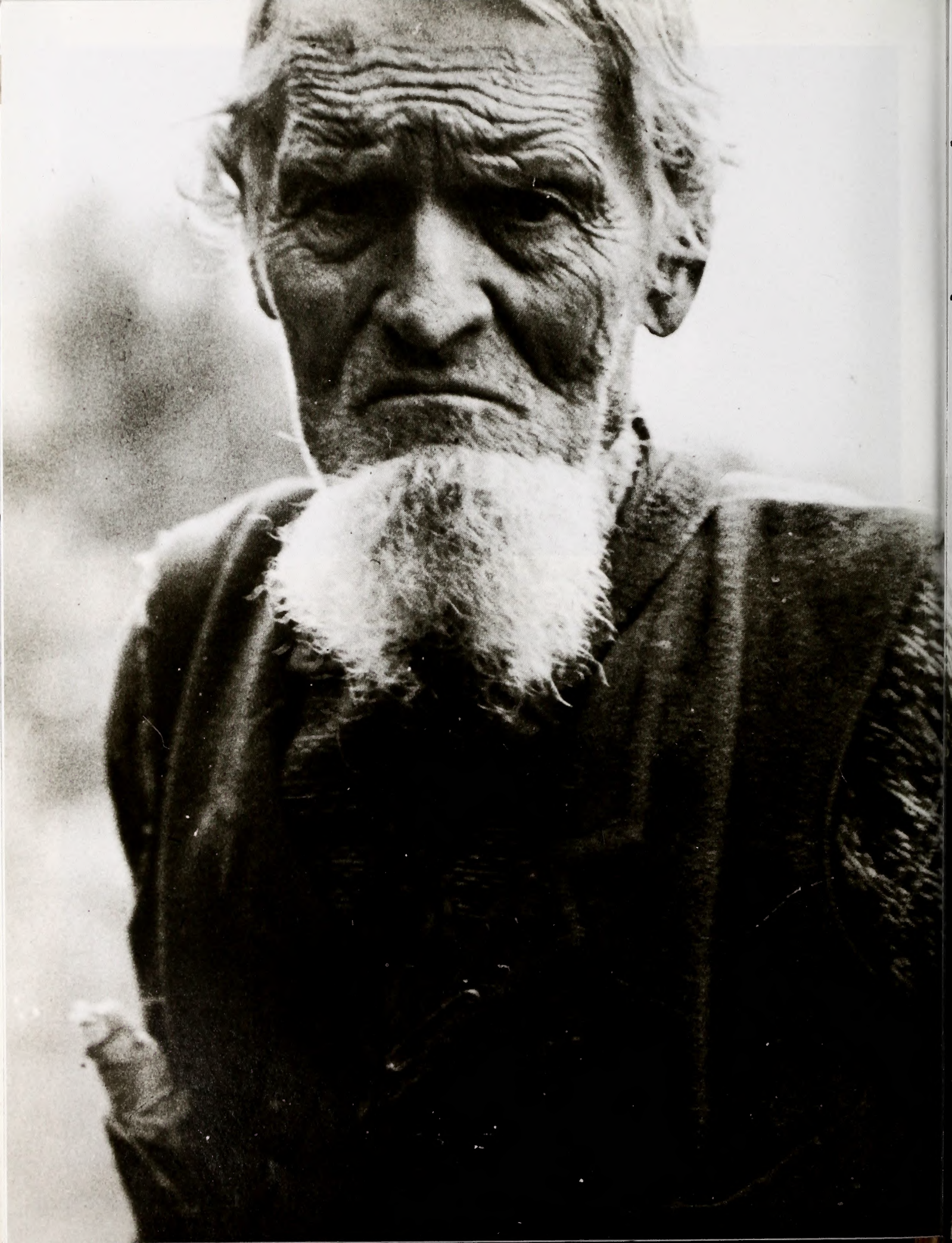
or 42 total teeth

***In contrast to** the teeth of black bears, raccoon's teeth are generalized to accommodate a varied diet of frogs, crayfish, fish, birds, small mammals, fruits, nuts and insects. A raccoon's skull is more rounded than the black bear's. It has well-developed premolars and more lower molars than the black bear.*

$$I\frac{6}{6}\ C\frac{2}{2}\ P\frac{8}{8}\ M\frac{4}{4} = \frac{20}{20}$$ *or 40 total teeth*



color illustrations by David Williams ©1997
technical illustrations by Renaldo Kuhler ©1997



BIG TOM WILSON

When Big Tom Wilson led searchers to the body of Elisha Mitchell in 1857, he cemented his reputation as North Carolina's most famous mountain man.

written by Tim Silver ©1997

N.C. ARCHIVES AND HISTORY

***Bear hunter, tracker** and master story teller, Big Tom Wilson became an accidental celebrity after finding the body of a famous scientist.*

In the years after the Civil War, some of the tourists called it a "plantation." But that was stretching the truth a bit. It was really only a small farm on the upper Cane River, near the tiny community of Pensacola, N.C. The buildings were simple: a nondescript three-room cabin, a crudely constructed open stable and a springhouse. Corn and other crops flourished on small plots nearby; chickens and livestock wandered aimlessly around the grounds. In summer, a loom with a half-finished piece of cloth sometimes stood on the porch. A motley collection of fishing rods, guns, traps and other hunting paraphernalia dangled from rafters and pegs throughout the house; a family Bible usually lay open beside one of the feather beds. From all appearances, it was an ordinary household with ordinary furnishings.

However, the man who lived there with his wife and children was hardly a typical mountain farmer. He entertained dignitaries from as far away as Boston and New York. He parleyed with state politicians. Newspapermen pestered him for interviews. Sketch artists and photographers sought him out. Indeed, he had so many visitors that someone eventually painted his name in block letters on the side of the cabin—either as a photographic backdrop or perhaps to make it easier to find the place. The sign read simply "Big Tom," and all who saw it knew they had arrived at the home of Big Tom Wilson, the foremost hunter, tracker and woodsman of the Black Mountains.

Big Tom had not always lived near Pensacola. He was born in the South Toe River valley in 1825. His ancestry was Scotch-Irish, and his full name was Thomas David Wilson. In the early 1850s, he moved to the Cane River region and married Niagara Ray, daughter of Amos Ray, a settler who held title to more than 13,000 acres on the river's headwaters. During their first years on the Ray property, Thomas, Niagara and their children worked the land in much the same way as other Appalachian farmers. They grew subsistence crops, occasionally sold livestock to local merchants and drovers, and augmented their annual harvests with chestnuts, honey and other forest produce. Exactly how and when Thomas David earned the name Big Tom remains something of a mystery. But family members agree that the title had little to do with his size (he was 6 feet 2 inches tall and spindly). Probably the Wilsons used the nickname to distinguish Thomas David from younger family members who shared his first name.

Big Tom adapted easily to life in his new home. He was skilled at robbing bee gums and always had some of the best honey to be found anywhere in the region. He was a master brook trout fisherman and deer hunter,

FRIENDS OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK

N.C. ARCHIVES AND HISTORY

N.C. ARCHIVES AND HISTORY

taking his share of both from the streams and forests on the family lands. But Wilson's real forte was stalking black bears.

In the 19th century, bear hunting was an integral part of male culture in the Black Mountains. A worrisome bear—one that rooted up crops or killed pigs—might be shot or trapped by a farmer at any season. But the most pleasurable and sporting way to take a bear was during the annual fall hunt. From late September until the first days of winter, small groups of men left their farms and camped deep in the forests. Using specially bred hounds (usually blue ticks or black-and-tans), the men hunted continuously for a week or longer, hoping to lay in a supply of bear meat and collect a few skins to trade with the region's itinerant merchants.

The hunt was as much a social as a utilitarian endeavor. The best hunters and dog trainers were rewarded not only with meat and hides but also with the admiration and envy of their friends. Many hunters must have been jealous of Big Tom Wilson. He developed an uncanny ability to negotiate rhododendron and laurel thickets and had a reputation for relentlessly following his dogs over the most rugged terrain. Hunters from near and far marveled at his stamina. Sometimes he left home for a week with nothing more than a pocketful of cornmeal, relying on his marksmanship to supply enough game to feed himself and his dogs. On these extended expeditions, he often pursued his quarry on foot, storing any bears he killed in a safe cache and returning later on horseback to retrieve them. Tradition holds that he killed somewhere between 113 and 117 of the beasts (an average of two to three per year) during his days as a hunter.

In the Black Mountain settlements, where rural people relied on storytelling to preserve their collective memories, talking about bears was almost as important as killing them. At church, around campfires and across fences, men regaled neighbors and newcomers alike with tales of autumn forest exploits. A hunter's reputation often depended on his ability to recount specific details of a given hunt—including his own adventures and achievements—without giving the appearance of bragging. When it came to this sort of overly modest talk, Big Tom had no equal. One of his sons later noted that "the old man" could leave home in the middle of a story "and talk right over" the mountains "and all the way back, and never make a break." Even today, family members fondly recall his remarkable ability to "paint a picture with words."

Yet Big Tom Wilson, bear hunter and storyteller without peer, might have lived and died in relative obscurity had he not been involved in one of the most sensational events of the 1850s: the search for Elisha Mitchell. The account of Mitchell's disappearance in the Blacks is an old and oft-told tale, but few who repeat it understand all its nuances or the peculiar way in which it shaped Big Tom's life.

***Wilson was a** well-known hunting guide even before his new fame. This engraving of Big Tom and his hunting dogs was published in* Harper's *magazine in 1857. After finding Elisha Mitchell (left), Wilson was pursued so avidly by journalists and other visitors that someone painted his name on the side of his cabin to guide them to his house (top, left).*

FRIENDS OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK

***Dolph Wilson, son** of Big Tom, points to the spot below Mitchell's Falls where his father found Elisha Mitchell in June 1857.*

Elisha Mitchell was a professor of science at the University of North Carolina and made trips to the Black Mountains in 1835, 1838 and 1844. Using a barometer to measure elevation, he determined that the Blacks were the highest mountains in eastern America. By 1844, however, he seemed unsure about which peak was tallest and exactly when he had been on it. In 1855, he became embroiled in a dispute with Thomas Clingman, a congressman from Buncombe County, who also claimed to have been first to calculate the elevation of the highest peak. After a brief visit to the mountains in 1856, Mitchell went back the next year, seeking more information that might bolster his claim.

On Saturday, June 27, 1857, Mitchell left his son Charles on the south, or Buncombe, side of the Blacks. The professor then headed off alone, intending to descend the northwest side of the range to the Cane River settlements. There Mitchell hoped to refresh his memory of earlier work by talking with someone who knew the route he had taken in 1835. Mitchell was to meet Charles the following Monday. When the professor failed to show, Charles began a search that eventually took him to Big Tom's farm. Upon hearing the news, Big Tom organized a group of local woodsmen and joined the search. They picked up Mitchell's trail and followed it to a small tributary of the Cane, where they found the professor's body at the base of a 40-foot waterfall. Mitchell's broken watch suggested that he lost his way in the dark and plunged to his death sometime after 8:00 on the evening of June 27. As Big Tom later remembered it, "underneath a pine log...I saw his body, and called to the boys, 'Here he is! Poor old fellow!'"

The professor was scarcely dead and buried in Asheville before Zebulon Baird Vance, then a little-known Buncombe County politician, and Charles Phillips, one of Mitchell's colleagues at the university, began a massive campaign to rehabilitate Mitchell's reputation and to discredit Clingman, whom Vance regarded as a political enemy. As some recent work by historian Thomas E. Jeffrey has shown, Vance and his supporters traveled throughout western North Carolina seeking evidence that Mitchell had indeed identified the highest peak before Clingman. One of those Vance was most eager to contact was Big Tom. The

N.C. ARCHIVES AND HISTORY

***Big Tom Wilson** stayed true to his mountain heritage throughout a long life of hunting, tracking and guiding.*

bear hunter immediately offered testimony supporting the professor, even though he had not known Mitchell well—if at all—and had to rely on the stories of other guides and acquaintances to prove the claim. Mitchell had been popular among mountain people, and others in the region soon rallied to his cause. By the time the public relations machinery stopped turning, Vance was a congressman (during the Civil War he would serve as governor); the professor's grave had been relocated to the mountain that now bears his name; and most North Carolinians knew Mitchell as a courageous explorer and Clingman as a backbiting scoundrel. Big Tom, however, was simply a celebrity.

All who met the famous tracker now wanted to hear about his discovery of Mitchell's body. Born talker and subtle self-promoter that he was, Big Tom always obliged. He gave at least two official accounts for publication, one in 1877 and another in 1903. The two versions differ slightly on some details but are remarkably consistent on three points. First, Big Tom was the only one of the searchers who believed Mitchell would be found on the Cane River side of the Blacks. He favored continuing the search even after those who had worked the Buncombe side were ready to give up and wait "until the buzzards circling around over the body should point out its direction." Second, when his party found an indistinct trail through moss and laurels, Big Tom insisted—even when others were skeptical—that the tracks were those of a man, not a bear. Finally, Big Tom alone negotiated the treacherous terrain around the waterfall and first saw Mitchell's body.

The Mitchell-Clingman controversy generated unprecedented interest in the Black Mountains. During the last half of the 19th century, the region became a mecca for tourists, hunters, fishermen and travel writers. Even before the professor's disappearance, Big Tom had established an informal hunting and guide service, which he operated from his cabin. He regularly escorted visitors on overnight trips to various high peaks and showed sportsmen the best techniques for taking deer, bear and trout. An account of one such excursion appeared in the November 1857 issue of *Harper's New Monthly Magazine*, complete with a sketch of Wilson, his rifle and two bear dogs.

As word of Mitchell's death and the details of the search spread, Big Tom became the most popular hunting and tour guide in

the region. In the 1880s, he entertained one of his most famous clients: the New England-born editor and essayist Charles Dudley Warner. Warner, who, with Mark Twain, coauthored *The Gilded Age*, was traveling through the southern mountains collecting material for a lengthy essay titled *On Horseback*, published in 1888. Not to see Big Tom, Warner knew, "was to miss one of the most characteristic productions of the country, the typical backwoodsman, hunter, guide."

By the time Warner visited the Wilson farm, some of the lands once held by Amos Ray had passed into the hands of absentee owners, who used the tract as a semiprivate hunting preserve. In addition to guiding visitors, Big Tom worked as a caretaker and gamekeeper, driving off stray cattle and local poachers who "explod[ed] powder in the streams to kill the fish." Like others who had visited the Wilson household, Warner found that talking with his host required "not the least effort." Indeed, once the bear hunter got started, the stories "flowed on without a ripple." Sitting before the cabin's massive hearth, Warner learned that Big Tom had served in the Confederate army, not as some crack-shot infantryman but as a fifer and musician. The Wilsons had also developed a passion for what, in mountain parlance, was called "lawin." At the time of Warner's visit, Big Tom was caught up in a protracted legal battle with a neighbor he had accused of trespassing. "There was an entire absence of braggadocio in Big Tom's talk," Warner later wrote, "but somehow as he went on, his backwoods figure loomed larger and larger." The visitor had an eerie feeling that he had met this intriguing fellow before, that he somehow knew this craggy mountain man with the "splendid physique" and "iron endurance." Finally it came to him. He *had* encountered someone much like Wilson, not in real life, but in the novels of James Fenimore Cooper. Big Tom "was the Leather-Stocking," that straight-shooting, forest-loving, wilderness hero who, under various names, appeared in several of Cooper's tales. Warner wondered if his new friend ever read such books. No, the rangy woodsman answered, and launched into yet another story.

The next morning, Big Tom took his guest up the narrow horse trail across Mount Mitchell. The guide showed the writer the usual sights: a giant poplar tree, the spot where Mitchell died (which conveniently afforded Big Tom the opportunity to entertain Warner with tales of the search), and the magnificent forests of the Blacks where "oaks, chestnuts, poplars, hemlocks, the cucumber, and all sorts of other northern and southern growths" met and mingled "in splendid array." At the summit, Big Tom shyly asked if his companion had a flask. Warner did not, and it was just as well, Big Tom said. He was not in the habit of using whiskey but thought a drop on Mount Mitchell might be appropriate and might do him good. He left Warner on the south side of the mountains and headed home. Warner rode on toward Asheville, convinced that he had met a real pioneer, "an original."

During the last years of the 19th century, Big Tom continued to make his living as a gamekeeper, guide and farmer. After publication of Warner's essay, the aging hunter became an almost mythical character, regularly posing with his gun for visiting photographers. Big Tom annually made several pilgrimages on foot to Asheville, where, according to one acquaintance, "his powerful figure with its massive head, snowy locks, and beard, and kindly eyes, attracted great attention as he walked the streets." Everyone "claimed the honor of being his friend, from the highest to the lowest [they] vied with each other in doing him honor." Even in old age, when he walked with a cane, the mountain man spent as much time as possible outdoors, often sitting alone on the riverbank near his home trying to tempt a wary trout.

". . . his powerful figure with its massive head, snowy locks, and beard, and kindly eyes, attracted great attention as he walked the streets."

Big Tom Wilson died in 1909 at age 83. In an informal eulogy, a family friend described the mountain man as "honest to the core, kind of heart, keenly intelligent although unlettered, devoutly religious and thrifty as only a canny Scotch-Irish hillsman knows how to be." Although never wealthy, Wilson "left a goodly estate of mountain lands, a worthy family of sons and daughters, and a name...honored in his native hills."

By the time Big Tom died, the region he had helped define was changing. The vast uncut forests attracted the attention of lumber companies, and in the years before World War I, loggers began to strip red spruce, Fraser fir and other timber from the high peaks. They spared only the most inaccessible tracts, including a small stand of trees on Mount Mitchell's summit that, in 1915, became part of North Carolina's first state park. The railroads that served the loggers stretched up the Cane, bringing more people and brief boomtown prosperity to Pensacola and the nearby communities of Murchison and Eskota.

Even so, Big Tom's family worked hard to preserve his memory and way of life. His son, Adolphus Greenlee Wilson (known as Dolph), allegedly killed some 112 bears and then retired from hunting so as not to exceed the number of bruins taken by his father. Dolph also worked as a hunting and fishing guide and operated a hotel that catered to sportsmen. During the 1920s, Dolph's son, Ewart, built a toll road that allowed visitors to travel by car from Murchison to Stepp's Gap, just below Mount Mitchell. Appropriately enough, Ewart named his thoroughfare the Big Tom Wilson Mount Mitchell Toll Road. Construction of the Blue Ridge Parkway eventually afforded tourists another way to the mountain. But bear hunters continued to use the Wilson route. Bill Sharpe's *New Geography of North Carolina*, published in 1961, explained that "when Big Tom lived, the hunters came from afar in wagons or on horseback. Now they come purring up in shiny automobiles...[and] drive up the old Big Tom Wilson toll road as far as they can and then are placed on stands along the bed of an old lumber railroad."

In 1947, several prominent North Carolinians, including Gov. R. Gregg Cherry, made sure that Big Tom Wilson's name would forever be associated with the Black Mountains. The group petitioned the federal Board on Geographic Names to rename two peaks adjacent to Mount Mitchell and previously known as the Black Brothers. The one closest to Mount Mitchell was christened "Mount Craig," in honor of former governor Locke Craig, who had been instrumental in securing the land for the state park. But the northernmost peak, with an elevation of 6,593 feet, was officially designated "Big Tom." It was perhaps the best possible tribute to the lanky, gregarious mountain man who, in the words of one admirer, had reigned over the region "as one of nature's own princes." ⊠

Research was drawn from S. Kent Schwarzkopf, A History of Mt. Mitchell and the Black Mountains: Exploration, Development, and Preservation *(Raleigh: North Carolina Division of Archives and History, 1985), and from Thomas E. Jeffrey, "'A Whole Torrent of Mean and Malevolent Abuse': Party Politics and the Clingman-Mitchell Controversy,"* North Carolina Historical Review *70 (1993).*

WILLIAMS LEA

Bear 187, Where Are You?

Tracking with telemetry helps biologists learn about black bear home ranges and the kinds of habitat they need to survive in North Carolina.

written by Roger Powell ©1997

Bear 187 is a big bear. I first met Bear 187 on Little Pisgah Ridge in the spring of 1988. Like many of the more than 150 black bears I have studied since 1981, he was caught in a live-trap, and he was not very happy. My students and I sedated him, measured him from nose to tail, and gave him ear tags and a radio collar. He was 2½ years old and weighed 110 pounds. Now he is more than 11 years old and weighs more than 365 pounds. At least he did last spring when he left his den after a five-month fast. Like I said, he is a big bear.

Since 1988, Bear 187 has changed more than just his weight. As one of the largest and oldest males in the Pisgah Bear Sanctuary, near Mount Pisgah, he does a disproportionate amount of the breeding. As a 2½-year-old 110-pounder back in 1988, he did not breed at all. Only when he reached full size and maturity, probably around age six, did he start breeding. How do I know this? Learning this has been a challenge.

The N.C. Wildlife Resources Commission established a system of black bear sanctuaries in 1972. The main goal for Gordon Warburton, my firstmaster of science student and now the black bear biologist for the Commission, was to initiate research on whether the Pisgah Bear Sanctuary met the two goals for the sanctuary system: 1) to protect a core breeding population of black bears, and 2) to provide dispersing bears for hunters. Other research goals soon developed.

My graduate students and I wanted to know why adult female bears in the Southern Appalachians do not defend territories like those in Minnesota and Canada. We wanted to learn what makes good habitat for black bears and be able to predict where bears concentrate their activities. We wanted to understand how bears choose their home ranges. And we wanted to understand the social organization and mating patterns of bears. In all, nine graduate students have studied with me, and we have received help from dozens of other students, as well as more than 300 Earthwatch volunteers.

Black bears in the North Carolina mountains avoid people and live in dense forests. We seldom see the bears we study. Instead, we use radio telemetry to follow them. We have radio receiving equipment mounted on a pickup truck, and, luckily, the Blue Ridge Parkway runs

***With few natural** enemies, an adult male black bear is impressive, yet secretive. A N.C. State University researcher and his students have learned plenty about Southern Appalachian bears including Bear 187 by tracking their movements and breeding habits.*

PHOTOGRAPHS BY ROGER POWELL

***Many live-trapped** bears are fitted with a radio tracking collar (bottom, left), which can be turned on and off by researchers. After being measured and collared, a large male bear is weighed (bottom, right) before being released. Special darts mounted to the collar can be fired remotely to sedate the bear weeks or months later.*

***For nearly 20 years,** author Roger Powell (left) and his students have studied black bears in the Pisgah Bear Sanctuary near Asheville. After a bear is trapped and safely sedated with drugs, it is given an ear tag and tattoo for identification. A blood sample taken from a bear (far left) indicates its general health and helps researchers identify the bear's family using DNA.*

the length of the Pisgah Bear Sanctuary along the highest ridge. When we stop at a scenic overlook along the Parkway, we receive bear signals from miles away. From a distance, we follow our collared bears and learn with whom they socialize.

Although tourists flock to our truck and ask questions when we stop at Parkway overlooks, we have yet to have one bear approach and ask for a collar. So, we have to live-trap them. We use primarily spring-activated, leg-hold snares modified to minimize the chances of injury. We check traps first thing every morning during our summer "trapping season." Trapped bears are safely sedated using drugs administered with a blowgun and dart, and we begin monitoring vital signs as soon as a bear is drugged. We then measure each bear, give it ear tags with identification numbers and a tattoo. We take a blood sample and sometimes give the bear a radio collar. Bears usually wake up about 45 minutes after being drugged.

Young bears are easy to trap. Old bears are not. Bears get wise to our traps. After being trapped a time or two, they learn how to steal the bait without getting caught. The last time we caught Bear 187, we had been after him for more than a year. He raided traps habitually, taking the bait without getting caught. When we finally did recapture him, he looked mad. Some bears appear scared when trapped. Others appear calm and collected. No one knows whether bears actually experience fear, calmness or anger. Nonetheless, Bear 187 sure looked mad to me, as though he knew that he had made a mistake.

Around the Fourth of July each year, we estimate the relative size of the bear population in the Pisgah Bear Sanctuary and in nearby nonsanctuary lands. To make this estimate, we place baits on trees at ½-mile intervals and check them after five days to learn how many have been taken by bears. Every year, more baits are taken by bears inside the sanctuary than outside, indicating that the density of bears is higher inside the sanctuary. The sanctuary provides the bears some protection, but whether it provides them enough is not clear.

From our radio telemetry we estimate mortality rates. By noting which female bears have cubs, we estimate reproduction. We also estimate reproduction from data that Wildlife Commission personnel collect from harvested bears. During the 1980s, deaths appeared to exceed reproduction in the Pisgah Bear Sanctuary, in part due to poaching, and our data indicated that the black bear population in the sanctuary was headed for a slow decline. Luckily, mortality has decreased in the 1990s, brightening prospects for the bear population.

If the bear population increases, does this brighten the prospects for individual bears? That depends on how dense the bear population becomes. At present, the population is limited by human causes like hunting, not by food shortage. Food is abundant in the Pisgah Bear Sanctuary, and bears have small home ranges. The home ranges could be even smaller if bears' foods were not found in distinct, widespread patches. Blueberries are generally found on ridge tops with white oaks or chestnut oaks, while huckleberries and red and scarlet oaks are more common on slopes. In one year, white oaks may produce lots of acorns, while other oaks do not. In another year, scarlet oaks might be productive, but not on every ridge where they occur. This kind of patchiness means that bears have to include within their home

ranges all the patches of food that they will probably need over several years.

The combination of high productivity of foods in the Southern Appalachians with patchiness of those foods explains why bears in the Pisgah Bear Sanctuary behave differently from bears farther north. In Minnesota and parts of Canada, where food production is low, adult female black bears defend territories and do not share their home ranges with other adult females. Even though the berry patches or oak stands in a bear's home range in the Southern Appalachians do not produce food every year, they often produce more food than one bear can eat. So, the bears share. Not only do home ranges of bears overlap tremendously in the Pisgah Bear Sanctuary, the bears often forage for food on the same ridges at the same time. The only bears that appear to avoid other bears are adult females with cubs. These females avoid adult males. Although little evidence exists of adult male black bears killing cubs, adult male grizzly bears do kill cubs. Evidently some danger exists for black bear cubs, too, and their mothers minimize the risk.

In the 1980s, Ph.D. student John Zimmerman developed a way to rate the suitability or quality of habitat for black bears in the Southern Appalachians. To rate the habitat in any place, we need to know characteristics of the local habitat, including whether the overstory includes oaks or other nut-bearing trees, whether roads are close, whether berries are in the understory, whether lots of rotten logs hosting beetle larvae are nearby. The rating combines all these factors and spits out a number ranging from 0 percent (bad habitat) to 100 percent (best habitat). A place with a high rating has abundant food, with den sites and cover nearby. Using measurements from maps, data for 60 sites spread across the Pisgah Bear Sanctuary, and computer graphics, John calculated a habitat suitability rating for every place in the sanctuary. He then tested whether the bears actually liked places with high ratings better than places with low ratings. They did. The bears we followed in the mid-1980s spent more time in areas with high ratings than in areas with low ratings.

Ph.D. student Mike Mitchell recently simplified John's rating system, tripled the number of sites in the sanctuary for which we have on-the-ground data, and developed computer maps of the habitat ratings across the sanctuary for each year from 1981 through 1994. The overall rating for the sanctuary decreased from 1981 through 1994, meaning that the quality of habitat has decreased for bears. Many parts of the sanctuary improved in quality because untouched forests matured and now produce more nuts and berries than they did in 1981. Nonetheless, overall quality has decreased due to many new clear-cuts. Clear-cutting eliminates both hard mast and understory berries for decades and introduces new roads.

Mike is now learning how to predict where bears establish home ranges in the Pisgah Bear Sanctuary and how much those home ranges will overlap if bears choose their home ranges optimally. Initial tests of Mike's predicted home ranges indicate that old female bears establish home ranges nearest to the best habitat and claim more resources than do young females. In addition, old bears reduce the food available for younger bears. The next step is to predict how many bear home ranges the Pisgah Bear Sanctuary can support. This number of home ranges is the carrying capacity of the sanctuary for bears.

During the breeding seasons in the summers of 1993-1995, Ph.D. student Adrienne Kovach kept close track of all the juvenile and adult males and all the adult females in breeding condition in the Pisgah Bear Sanctuary. Bear 187 wandered far during those summers and maintained a home range that sprawled across about 25 square miles. In contrast, adult females maintained home ranges that averaged less than 8 square miles. Bear 187 and three other big males kept close track of the females, moving among them on a regular basis. Adrienne's analyses indicate that juvenile male bears also associated with adult females and moved across the study area from female to female. Each juvenile male spent many days with a female when no other males were around, then would move to another female. The big males, Bear 187 and his cohorts, however, had different movement patterns. The big males spent time only with females who were ready to breed. They did not waste days associating with females that were not ready to breed. When a big male joined a female, the younger males were displaced and did not get to breed. How do we know that? That took some extra work.

Each winter, we follow the bears' radio signals to their dens. During recent winters, we found seven females with newborn cubs denned in places where we could sedate them. With the females safely immobilized, we removed the cubs from the dens, took small blood samples, tagged them, and then put them back into their dens with their mothers. From the blood samples, Adrienne extracted DNA. Comparing the DNA of the cubs to that of all the males we have captured in recent years, Adrienne deduced who the fathers were. For 23 of 24 cubs, the father was Bear 187 or one of his cohorts. Only one cub was fathered by a young adult male who was not yet very big.

Last April, Bear 187 adjusted his body from his winter, fasting mode to his summer, active mode. During spring and summer he ate succulent leaves, ant larvae and berries. He also mated with as many females as he could find. During fall, he has finished his feasting on acorns, grapes, and other nuts and fruits, and he has prepared to enter a new den for another long rest and fast. I look forward to following Bear 187 through his cycle next year. ⊠

After a busy summer *mating season and a feast of acorns, grapes and other nuts this fall, Bear 187 will soon select a den for another long winter rest.*

WILLIAM S. LEA

Awwww NUTS!

A gray squirrel flicks his tail vigorously and watches you. He was foraging for acorns and you just interrupted his busy schedule.

Written and illustrated by Consie Powell

HARD MAST

Squirrels aren't the only animals that depend on acorns and other nuts for food in autumn. Many mammals and birds feast on the large, tough seeds of woody plants that are often called **hard mast**. These seeds are partly or completely enclosed by a leaflike structure called an involucre (in-vol-OO-cur). The involucre is the rough cup that holds **acorns**, the spiny case that encloses **beechnuts**, the hard husk that surrounds **hickories, pecans, butternuts** and **black walnuts**, and the leafy envelope that encases **hazelnuts**.

Eastern white oak

Northern red oak

Acorns are probably the most frequently eaten hard mast because they are an abundant and dependable food source. Acorns from red oaks (Southern and Northern red oak, willow oak, laurel oak, water oak, blackjack oak) germinate in spring, and are bitter tasting. The more ***palatable*** *white oak acorns (Eastern white oak, post oak, swamp-chestnut oak, live oak) germinate in autumn and have fewer bitter tannins.*

NUTS ARE SEEDS

Oaks and nut trees produce tiny flowers early in spring, often before their leaves are fully unfolded. At the base of a female flower is the ovary, which contains **ovules** that are fertilized by wind-borne **pollen** from male flowers. Within the ovary, male and female cells fuse to form the seed of a new plant. The **embryo** of the seed is what will become a sprouted stem and root, and the **endosperm** is the food supply that nourishes a growing embryo. It is the endosperm that makes up the tasty and nourishing parts of those seeds that we call hard mast.

Beech

Hickory

Pecan

DOWN THEY COME

Most nuts and acorns mature during summer and drop to the ground in autumn, although a few kinds of oaks produce acorns that don't mature until autumn of their second year. Nuts and acorns have no built-in devices for seed distribution like the wind-catching wings on maple seeds or the fur-snagging hooks on beggar ticks. They just plop down and grow where they fall. Of course, most nuts are moved or devoured by animals.

The term "mast" comes from a Germanic word meaning "food."

GOOD FOOD

Hard mast is a more nutritious plant food than stems, leaves, flowers or bark. Seeds have high levels of protein and fat. Protein builds muscle, and fat fuels the body when it's hungry. In addition, carbohydrates provide instant energy, and vitamins and minerals help protein, fat and carbohydrates work effectively. A mast-producing tree packs acorns or nuts full of nourishing goodies to provide a food source for an infant tree. Squirrels, chipmunks, opossums, deer, black bears, raccoons, wild turkeys, ducks and numerous other birds and small mammals, however, benefit the most from those wonderful seeds.

Live oak

Soft mast includes pine seeds, grapes, apples, persimmons, berries and other wild fruits.

NEW TREES WILL STILL GROW

Plants have ways to protect their seeds from being eaten before at least some of them **germinate**. Many oaks contain bitter-tasting substances called **tannins**. The tough or spiny involucre protects many nuts from insects and other hungry animals while they mature. Squirrels often bury nuts or acorns to save for later; those that are forgotten have a head start on germination. In addition to reproducing from seeds, most mast-producing trees **regenerate** by sprouting from a trunk or root stock.

Willow oak

Black walnut

THE AMERICAN CHESTNUT - GONE BUT NOT FORGOTTEN

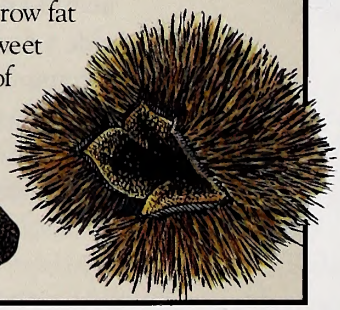
A hundred years ago the forests of the entire eastern United States from Maine down to the Appalachian foothills were thick with large, majestic trees of incredible beauty and magnificent bounty. The American chestnut tree's broad canopy provided shelter, its wood was used for furniture, fenceposts and railroad ties, and its sweet and plentiful nuts fed people and wild animals alike.

In the early 1900s, an Asian fungus disease called the chestnut blight was accidentally brought to North America from Europe. This disease only moderately affects European chestnuts, but it was devastating to American chestnuts. By the late 1930s, chestnut trees everywhere had been infected. With the death of those trees, a precious part of America's heritage was gone.

As a mast-producing tree, the American chestnut was immensely important, for it consistently produced large quantities of sweet and nutritious nuts. Animals such as black bears, deer and wild turkeys which undoubtedly ate chestnuts as a major part of their diets had to substitute less **palatable** acorns as their primary food.

U.S. FOREST SERVICE

The chestnut blight kills only the part of a tree above the soil, so root stocks of the old chestnut trees are still alive. Sprouts regenerate from old stumps, but before the sprouted branches reach nut-bearing size, the blight infects them. Botanists are working to develop blight resistant strains of American chestnut. Perhaps someday western North Carolina's black bears and other wild animals will once again grow fat on the sweet nutmeats of American chestnuts.



Water oak

WHAT DOES IT MEAN?

hard mast: the collective name given to nuts and acorns eaten by many species of wildlife
ovary: the part of a flower that contains the female egg cells or ovules
ovules: the female reproductive cells
pollen: the powdery plant substance that carries male reproductive cells to female flowers
embryo: the part of a fertilized ovule that becomes a new plant
endosperm: the food-storing tissue that surrounds and nourishes the embryo
germinate: the process, affected by light, temperature, oxygen and moisture, by which a seed begins to grow into a plant
tannin: chemical compound found in certain plants that protects them by making them taste bitter and by reducing their food value
regenerate: the process by which new tissue grows from part of the original plant
palatable: tasty, digestable and of high food value

READ AND FIND OUT

Faith in A Seed by Henry D. Thoreau, Island Press, 1993.
A Field Guide to Eastern Trees by George A. Petrides, Houghton Mifflin Co., 1988.
From Flower to Fruit by Anne Ophelia Dowden, Thomas Y. Crowell, 1984.

In *Wildlife in North Carolina:*
"Autumn Oak Watching" by Lawrence S. Earley, October 1987.
"The Curious Cycle of Mast" by Lawrence S. Earley, November 1984.
"The Mighty Oaks" by Eddie Nickens, October 1993.

Butternut

Deer antler and acorns

GET OUTSIDE

Collect mast: How many kinds of mast can you find and identify?

Sprout an acorn: Bury an acorn in loose damp soil. Keep track of when you planted it and how long it takes to sprout. How fast does it grow? (White oak acorns germinate sooner than red oak acorns.)

Find a chestnut tree: If you go hiking in the mountains next summer, watch for huge old stumps (chestnut wood is very rot resistant). Are branches sprouting from it? You're looking at history!

Serve up some mast: Make a delicious salad by combining a half-cup of chopped nutmeats (pecans or walnuts are especially tasty) and a cup each of halved grapes and chopped apple. Add a few blueberries or blackberries if you have them. Mix in two tablespoons of fruit yogurt and enjoy.

IT'S WILD!

Project WILD activities for teachers and students that correlate to this topic include:

What's for Dinner?: teaches students that all animals, including people, depend on plants as food sources, either directly or indirectly.

Wild Edible Plants: teaches students to identify native edible plants and to describe the relationship between wild and cultivated plants.

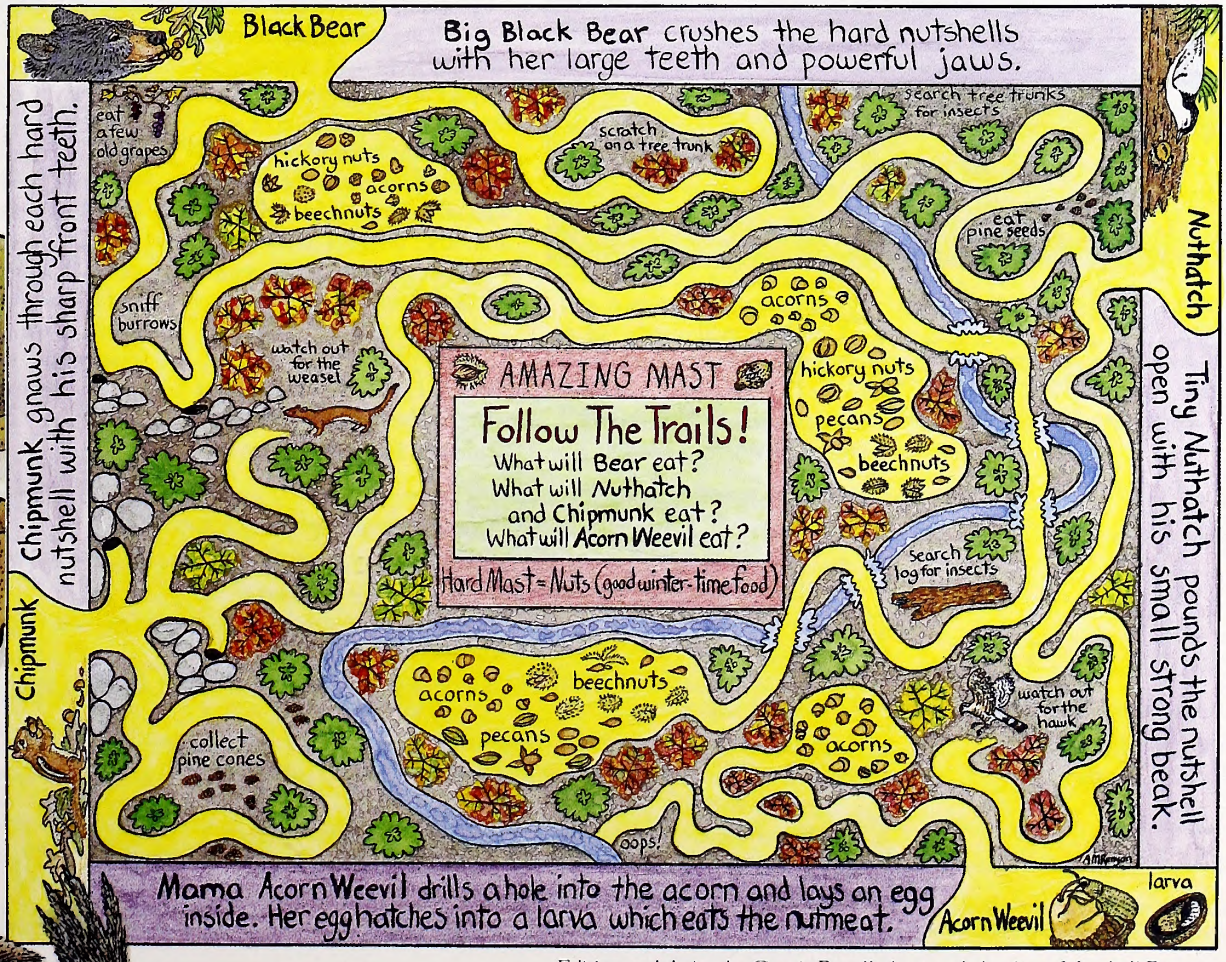
How Many Bears Can Live in This Forest?: teaches students to define a major component of habitat and to identify a limiting factor.

Carrying Capacity: teaches students to formulate and test hypotheses related to wildlife populations and carrying capacity.

LET US KNOW

Hazel

What mast trees grow where you live? Did you find oaks that weren't mentioned in this article? What kinds of hard mast are in our gray squirrel's nutpile? What is his mystery food and where do you think he got it? What other mast eaters are on these pages? Please share your responses, nutty experiences or pictures with us. Mail them to *North Carolina WILD Notebook*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.



Editing and design by Consie Powell. Art puzzle by Anne Marshall Runyon.

Plans Underway to Release Elk in Great Smoky Mountains National Park

LEONARD LEE RUE, III

***Elk once roamed** much of the East including North Carolina. If all goes according to plan, as many as 50 elk could be released into the Great Smoky Mountains National Park.*

After years of discussion and study, a small number of elk are planned to be released into the Great Smoky Mountains National Park along the North Carolina-Tennessee border.

Elk, which can reach up to 1,000 pounds, were native to much of the East including North Carolina, but were eliminated by the mid-1800s by extensive hunting and land-use changes. Park officials have considered moving the animals to the Smokies for nearly a decade. After reviewing current habitat conditions, park managers have decided on an experimental release to determine whether the park can sustain an elk herd.

Major areas of concern are whether the 800-square mile park is large enough to provide a stable range for elk, the impact of various parasites and diseases on elk, and whether the animals can adapt to the park's largely forested terrain.

Park officials plan to work with wildlife management agencies and local land managers to prepare an environmental assessment before the arrival of any elk. Possible negative impacts—including the threat of imported wild elk spreading brucellosis and other diseases to livestock—will be discussed and open for public comment.

If the results of the discussions are promising, up to 50 elk could arrive as early as next winter. The animals will be held in an acclimation pen at Mt. Collins near Clingmans Dome before release.

Biologists will use radio telemetry to monitor elk movements and decide if the animals can effectively use the park's high-elevation balds as grazing habitat. Scientists have speculated that elk along with periodic wildfires helped create and maintain the grassy, exposed mountain balds—some of which still exist in the Smokies.

"Historically, the extent of the balds was much greater than it is today," said Smokies Superintendent Karen Wade. "It is possible that elk and other native grazers were a key influence in maintaining that openness. This experimental release of radio-collared elk will yield essential information on the elk's movements and habitat preferences."

The project is a partnership between the National Park Service, the U.S. Geological Survey's Biological Resources Division and the Rocky Mountain Elk Foundation. The nonprofit foundation has committed to assist the two government agencies with the out-of-pocket costs of the release project.

—Information courtesy of the National Park Service

Written and Edited by Rodney Foushee

North American Elk Facts

Average size: newborn calf - 35 pounds; cow - 500 pounds, 4½ feet at the shoulder, 6½ feet from nose to tail; bull - 700 pounds, 5 feet at the shoulder, 8 feet from nose to tail

Color: body varies from deep coppery brown to light tan, depending on location and season; rump patch is light beige; legs and neck are often darker than body

Antlers: grown annually by males; used to display dominance, occasionally for defense; weigh up to 40 pounds for the pair

Communication: body postures; vocalizations such as squeals, barks and bugles; scent

Food: varies with season and location; generally grasses and parts of woody plants in winter; grass in spring and fall; grass and forbs in summer

Predators: humans, grizzly bears, mountain lions, wolves and coyotes

Range: prior to 1800s - throughout North America, except Florida and Alaska; at present - 24 states and five Canadian provinces

Population: about 1 million in North America (roughly 10 percent of population before European settlement of North America)

SOURCE: ROCKY MOUNTAIN ELK FOUNDATION

Harry Ellis: True Naturalist

Dear Wildlife:

What a wonderful surprise to see Harry Ellis featured in the August issue of *Wildlife in North Carolina*. I was delighted to see the article gave Mr. Ellis some of the praise and glory that he richly deserves.

I have admired his color photographs in your magazine for years and use his work and articles on mushrooms, salamanders, butterflies, etc. regularly in my college biology classes. His documentation through wildlife and nature photography is one of the main reasons I continue to subscribe to *Wildlife in North Carolina*.

Hopefully we will have many more years of seeing his sensitive articles and fantastic photos in your magazine. Such a "true naturalist" as Harry Ellis is indeed a state treasure!

—Henry W. Robison
Professor of Biology
Southern Arkansas University
Magnolia, Ark.

Field Notes

Eastern Gun Deer	Through Jan. 1
Central Gun Deer	Opens Nov. 17
Western Gun Deer	Nov. 24-Dec. 13
Northwestern Gun Deer	Nov. 24-Dec. 13
Central Bow and Arrow Deer	Closes Nov. 8
Northwestern Bow and Arrow Deer	Closes Nov. 15
Western Bow and Arrow Deer	Closes Nov. 22
Central Muzzleloading Deer	Nov. 10-15
Northwestern Muzzleloading Deer	Nov. 17-22
Black Bear	See *Regulations Digest*
Wild Boar	Closes Nov. 22; Re-opens Dec. 15
Gray Squirrel	Through Jan. 31
Fox Squirrel	See *Regulations Digest*
Rabbit	Opens Nov. 22
Pheasant (Nonnative, males only)	Opens Nov. 22
Fox	See *Regulations Digest*
Raccoon and Opossum	See *Regulations Digest*
Bobwhite Quail	Opens Nov. 22
Ruffed Grouse	Through Feb. 28
Mourning Doves (middle season)	Nov. 24-29
Rails, Gallinules and Moorhens	Through Nov. 8
Common Snipe	Opens Nov. 14
Crow	See *Regulations Digest*

Information on bag limits, either-sex deer seasons and other regulations may be found in the *1997-98 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission.

The 1998 North Carolina Wildlife Calendar Is Here!

This detail of Robert C. Flowers' "Flushed" is one of 12 fine paintings featured in the 1998 North Carolina Wildlife Calendar. Order now before they're sold out.

The works of Robert C. Flowers, James A. Brooks, Robert B. Dance, Dempsey Essick, Bob Herr, Denise Nelson, Duane Raver and Raney G. Rogers are featured in the 1998 North Carolina Wildlife Calendar.

Order yours today! Payment must accompany your order. Calendar orders may be charged to VISA or MasterCard, or enclose your check or money order (payable to NCWRC). Complete the form below and mail with payment to:

1998 Calendar, N.C. Wildlife Resources Commission
512 N. Salisbury Street, Raleigh, N.C. 27604-1188
(Office is located at 322 Chapanoke Road in Raleigh.)

GREAT CHRISTMAS GIFT!

Please send me _____ Calendars at $6.00 each . . . . . .$_____

All N.C. residents add $.36 sales tax per calendar . . . . . _____

☐ Enclosed is my check for total payment of . . . . . .$_____

☐ Charge to MasterCard or VISA for the calendar(s) ordered above. My card number is _____ and the expiration date is _____/_____.

_____ (_____)_____
Card holder signature | Day Time Phone No.

If ordering 7 or more calendars, please provide your UPS deliverable address.

Name _____

Address _____

City/State/Zip _____

Phone (_____) _____

All orders must be prepaid. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512). **For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CAL098

State Adds Shellfish Sites

The N.C. Division of Marine Fisheries is building six new recreational shellfish access sites in Carteret County in an effort to make oysters and clams more accessible to the public.

The new access sites are being built along the shoreline on the north side of the Morehead-Beaufort causeway, near the public pier at the Harkers Island bridge, Hoophole Creek in Atlantic Beach, Back Bay near Cedar Island and Sleepy Creek near Marshallberg. The DMF has located the recreational sites near roadways so that the non-boating public can easily access shellfish beds.

The DMF is creating the access sites by "planting" shell material along designated shorelines. In order for oyster larvae to survive, the larvae must attach to a hard surface, preferably old shells. Oysters will grow on the old shells and can be harvested when they reach 3 inches. The shells also provide protection for small clams and organisms which attract fish.

For more information on recreational shellfish access sites, contact Mike Marshall, DMF-Morehead City, at (919) 726-7021 or 1-800-682-2632.

Commission Works to Restore Longleaf Pine in Sandhills

KEN TAYLOR

A Wildlife Commission technician *(above) uses fire to burn back the undergrowth from a longleaf pine on the Sandhills Game Land. The white band denotes that the tree contains a red-cockaded woodpecker nesting cavity. Controlled burning is one of the best tools wildlife managers can use to restore the longleaf pine ecosystem, which in turn supports a variety of plants and animals*

The Wildlife Commission's Sandhills Game Land represents one of the Southeast's best examples of the longleaf pine forest that once stretched from southeast Virginia to Texas and covered almost 90 million acres. Today, because of land conversion and fire suppression, the longleaf forest has dwindled to less than 4 million acres. Much of this is on public lands.

Forest management activities on the 57,000-acre Sandhills Game Land, located in Richmond, Scotland and Moore counties, are geared toward maintaining and restoring the longleaf pine ecosystem. However, declining populations of several wildlife species stand to benefit greatly from management activities aimed at restoring the longleaf pine. Of particular significance are the benefits to bobwhite quail, whose populations have plummeted throughout the Southeast since the early 1970s, and red-cockaded woodpeckers, an endangered species that nests and roosts in cavities constructed in live longleaf pines. Both of these species thrive in the healthy longleaf forest.

The Sandhills' forester, Bill Parsons, and his personnel have been busy setting both winter and summer prescribed fires to suppress hardwood mid-story trees and encourage native groundcover plants. In the past year, the Sandhills forestry crew burned about 4,000 acres during the winter and more than 10,000 acres during the summer. Summer burns mimic natural lightning fires that once burned through the longleaf forests regularly before humans could effectively control them. Summer fires are preferable because they kill more hardwoods and encourage better growth from native groundcover plants.

Several associated projects are supporting the burning program on the Sandhills Game Land. Tall Timbers Research Station, the U.S. Forest Service, the U.S. Army and the Wildlife Commission are cooperating in a long-term research project to compare the effect of summer and winter fires on wildlife populations. Research plots are located on the game land and on Fort Bragg Military Reservation in Cumberland County.

The State Council of Quail Unlimited and Exxon Co. USA also cooperated with the Commission to fund the construction of 16 miles of new permanent firelines along critical sections of the game land. "The new firelines have been a great asset to our program," Parsons explained. "These firelines were constructed in areas where we have experienced difficulty burning in the past due to poor access and inadequate firelines adjacent to private lands."

"Our knowledge about the role of fire has expanded greatly in recent years," Parsons said. "The longleaf pine ecosystem and wildlife populations dependent upon it are benefiting from the cooperation of a diverse group. Support we receive in conducting research and financial assistance to accomplish on-the-ground jobs like the construction of permanent firelines are two of the key factors involved in reaching our goal of restoring the healthy longleaf pine forest and its associated wildlife."

—Terry Sharpe
Small Game Project Leader

North Carolina Outdoor Calendar of Events

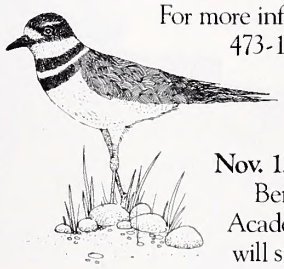
On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

Nov. 2

The city of Raleigh will sponsor its first N'Art Extravaganza, an art and nature festival, at Lake Johnson Nature Park. The event will feature arts, crafts, nature booths and explorations. For more information, call (919) 831-6640.

Nov. 7-9

A major new outdoor event titled "Wings Over Water" will be held on the Outer Banks to celebrate the wildlife and wild lands of eastern North Carolina. The event, which is sponsored by several groups including the U.S. Fish and Wildlife Service and the Coastal Wildlife Refuge Society, will feature workshops, lectures and field trips with a focus on birdwatching. Nearly 100 field trips and workshops are scheduled on the Outer Banks and the mainland. For more information, call (919) 473-1131. For a registration packet, call 1-800-446-6262.



Nov. 13-15

Bertie County Schools' Academic Booster Club will sponsor "Bucks for Bertie," an annual deer hunt to raise money for school improvements and scholarships. For $300, hunters are treated to 2½ days of guided deer hunting on about 40,000 acres of prime hunting land. Local landowners, guides and volunteers serve as hosts. Other events include a cookout and a turkey shoot. The program has raised more than $100,000 to help buy computers for local schools and establish a scholarship fund. For more information, contact Doc Haislip at (919) 793-8987.

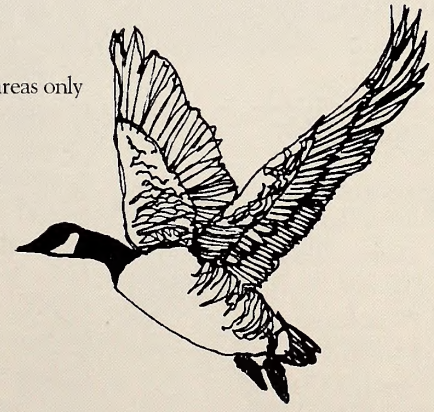
1997-98 Bag Limits, Shooting Hours and Season Dates for Waterfowl

See the current *North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for other regulations concerning waterfowl.

BAG LIMITS

Conventional bag: 6 ducks with no more than 1 black duck (black duck season closed until Dec. 1), 4 mallards with no more than 2 hen mallards, 2 wood ducks, 2 redheads, 1 fulvous tree duck, 1 mottled duck, 1 canvasback or 3 pintails. The season on harlequin ducks is closed. (Possession limits are twice the daily bag unless otherwise noted.)

Other limits: a) 10 snow geese, 30 possession
b) 2 brant
c) 5 mergansers (1 hooded merganser)
d) 7 sea ducks (4 scoters) in special sea duck areas only
e) 15 coots
f) 2 Canada geese



HOURS

One-half hour before sunrise to sunset.

SEASONS

Ducks, Mergansers and Coots: Oct. 1-4, Nov. 17-Jan. 20
Sea Ducks: Oct. 1-Jan. 20
Snow and Blue Geese: Oct. 24-Nov. 1; Nov. 15-March 10
Brant: Nov. 24-Jan. 20
Swan: Oct. 20 -Jan. 31 (by permit only—5,000 will be issued)
Canada Geese: Oct. 1-Nov. 15 except Bertie, Camden, Chowan, Currituck, Dare, Hyde, Northampton, Pasquotank, Perquimans, Tyrrell and Washington counties
Special Youth Waterfowl Hunt Day: Jan. 24. Youths 15 years of age or under may hunt when accompanied by a properly licensed adult age 21 or over. Species include ducks,merganser and coots. The adult may not hunt these.

You may also call 1-800-675-0263 for this information.
Report all bands by calling 1-800-327-BAND.

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.
- Connect to the Commission's online web site at **http://www.state.nc.us/Wildlife/**

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through August 1997

Principal Balance
$24,073,575.21

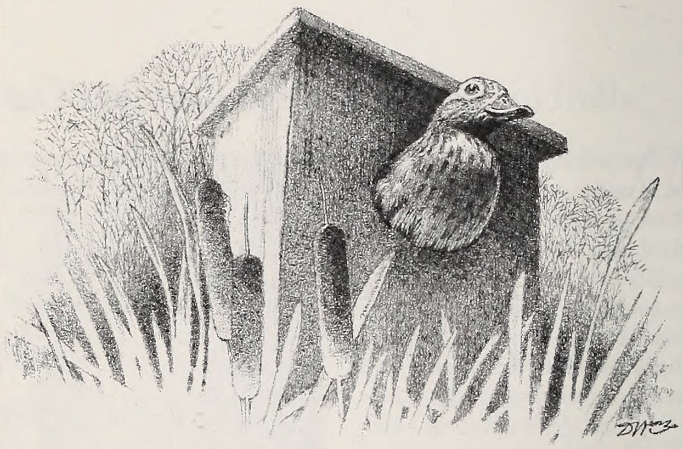
Interest Earned
$23,209,122.71

Total Receipts
$47,282,697.92

Interest Used
$12,329,807.04

Fund Balance
$34,952,890.88

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.



Boxes for Wood Ducks

by Rodney Foushee

The wood duck is North Carolina's most abundant duck species and, arguably, its most beautiful. Though its numbers have recovered from near extinction at the turn of the century, a lack of natural nesting cavities limits the continued growth of wood duck populations. You can help by building and placing wood duck boxes in suitable places where natural tree cavities may not exist.

November is an excellent month to begin putting up new wood duck nest boxes. Boxes should be placed in ponds and swamps at least 5 feet above the water and tilted slightly forward to allow hatchlings to escape easily. Always place boxes near plenty of cover, several hundred yards apart and out of sight of each other to prevent dump nesting—several hens laying eggs in the same box. A cone-shaped metal predator guard is also a must to prevent snakes and raccoons from eating the eggs. Since woodie pairs start searching for nest sites in the winter, all new boxes should be in place by the end of December.

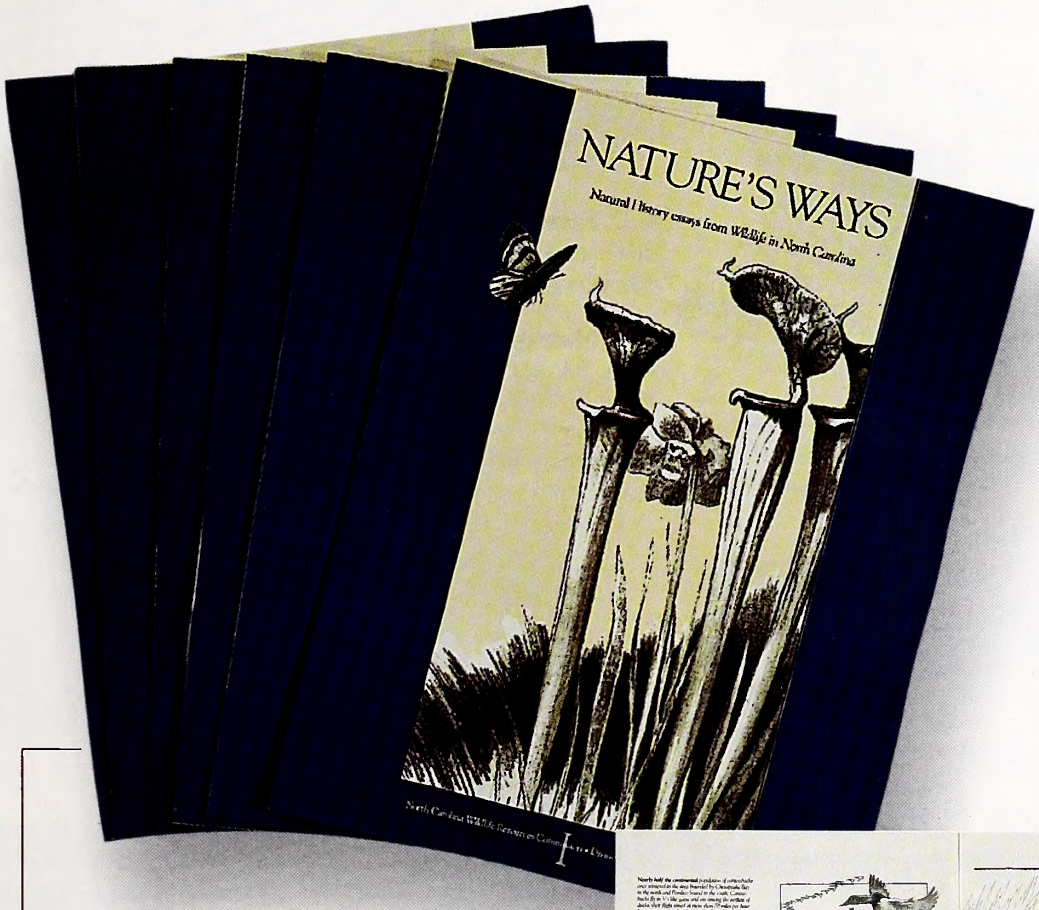
Now is also a fine time to remove old nesting material, eggs, insect nests and other debris from existing duck boxes. Box use is much higher if boxes receive annual maintenance. Fresh cedar or cypress shavings should be added and any necessary repairs completed before January to avoid interfering with nesting.

To help maintain healthy wood duck populations, the N.C. Wildlife Resources Commission has produced a 22-page booklet, *North Carolina Wood Ducks: Natural History and Management*. This handy guide provides a detailed look at the natural history of wood ducks, including distribution and habitat requirements. In addition to covering woodie biology, the booklet explains various habitat improvements and wood duck management techniques such as pond and nest box management. Step-by-step plans for building nest boxes and predator guards are also provided.

To obtain the free wood duck booklet, write the Wildlife Commission's Division of Wildlife Management, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Or call (919) 733-7291.

N.C. WILD STORE

Explore the Mysteries of Nature



NATURE'S WAYS

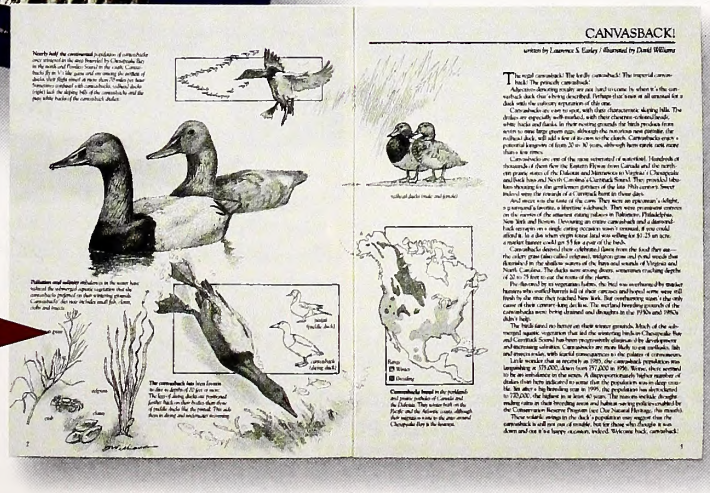
Natural History Essays from Wildlife in North Carolina

Why do some birds decorate their nests with snake skins? Why is the Roanoke bass found in only a few rivers in North Carolina? How did the ivory-billed woodpecker become extinct?

For nearly 20 years, the illustrated "Nature's Ways" columns in the pages of *Wildlife in North Carolina* have answered scores of questions like these in brief, entertaining essays. Now more than 200 of these essays have been collected in six paperback volumes that will delight readers, young and old, with their eye-opening insights into North Carolina's natural curiosities.

A wonderful gift for every nature lover!

Sold only as a 6-volume set. **$27.50.**
ITEM CODE **M9**



Short essays and beautiful illustrations have been the formula to the popularity of "Nature's Ways" over the years. This article on the comeback of the canvasback duck in North Carolina is one of over 200 articles in the collection. They can easily be photocopied and used in the classroom, and parents and children also can read them together at home.

More terrific items

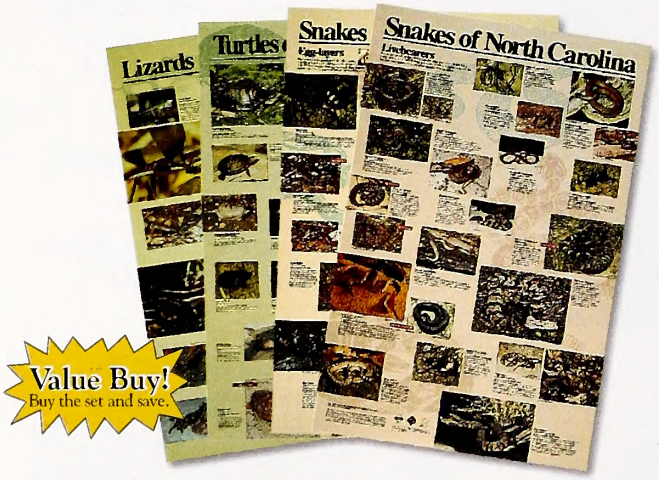
All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE

White, 100% cotton (preshrunk) T-shirts are guaranteed for comfort and durability. Each shirt features an original design.

N.C. WILD T-SHIRT
N.C. WILD logo printed on front and colorful art on back. $14.50.
ITEM CODES:
A4MED (medium)
A4LRG (large)
A4XLG (extra large)
A4XXL (extra extra large)

WILDLIFE IN N.C. T-SHIRT
WINC magazine logo on front pocket. Tundra swan art on back. $14.50.
ITEM CODES:
A5MED (medium)
A5LRG (large)
A5XLG (extra large)
A5XXL (extra extra large)



LIZARDS OF N.C.
Shows all 12 of the state's lizard species. 22" x 34". $6. ITEM CODE **P3**

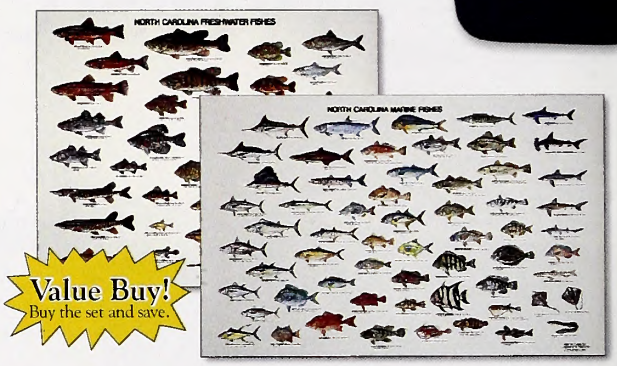
TURTLES OF N.C.
Shows all 21 of the state's turtle species. 22" x 34". $6. ITEM CODE **P4**

SNAKES OF N.C. (LIVEBEARERS)
Shows all 17 of the state's livebearing snake species. 22" x 34". $6. ITEM CODE **P5**

SNAKES OF N.C. (EGGLAYERS)
Shows all 19 of the state's egg-laying snake species. 22" x 34". $6. ITEM CODE **P8**

SET OF 4 POSTERS
You'll save $6 by purchasing the set of four posters above. $18.
ITEM CODE **P10**

N.C. WILD CAP
N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. $16.50.
ITEM CODE **A1**

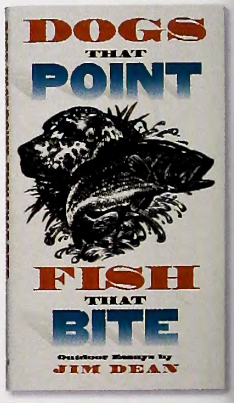


N.C. FRESHWATER FISHES
Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6. ITEM CODE **P6**

N.C. MARINE FISHES
All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6. ITEM CODE **P7**

N.C. FRESHWATER FISHES AND N.C. MARINE FISHES
Save $2 when you buy both posters as a set. $10. ITEM CODE **P9**

WILDLIFE IN N.C. CAP
Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with an adjustable cloth strap and buckle closure. Two-tone cap is navy/stone. $16.50.
ITEM CODE **A2**



DOGS THAT POINT, FISH THAT BITE
Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. $19.95. ITEM CODE **M8**

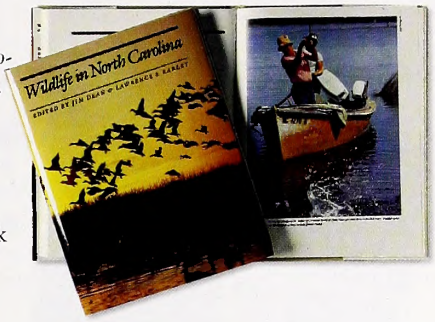
WILDLIFE IN N.C. CAP
Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. $16.50.
ITEM CODE **A3**

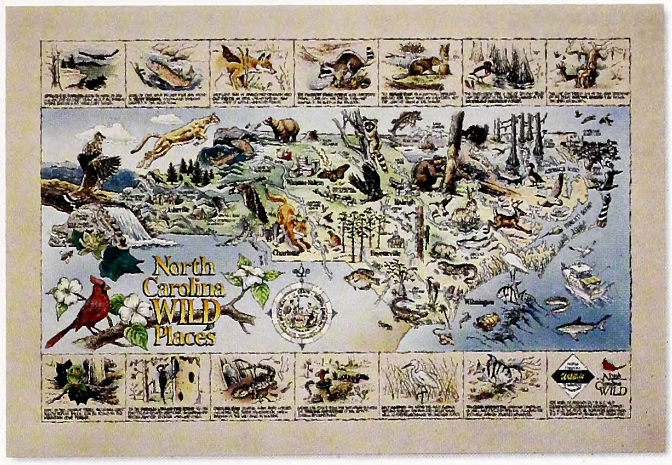
Wildlife in North Carolina Book

The best of *Wildlife in North Carolina* magazine. Hardbound. $12.
ITEM CODE M3

Magazine Binder

Store 12 issues of the magazine in this sturdy brown leather-look binder with gold lettering. $10.
ITEM CODE M2





North Carolina WILD Places Map

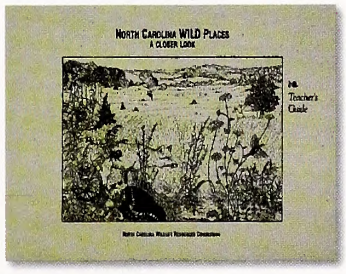
Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4

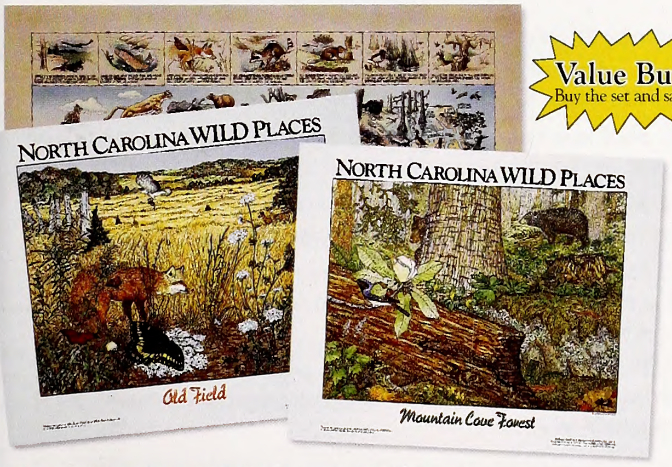
Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6

North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7

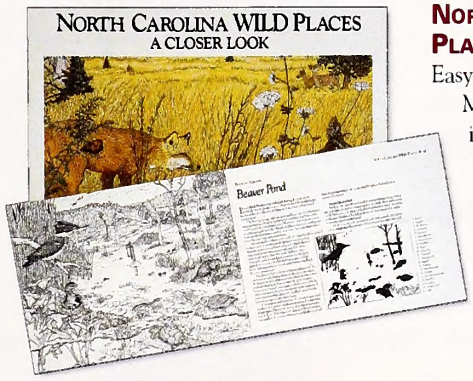




Value Buy!
Buy the set and save.

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look*. 19 1/2" x 16". Shipped folded with poster version of WILD Places Map. $8. ITEM CODE E5

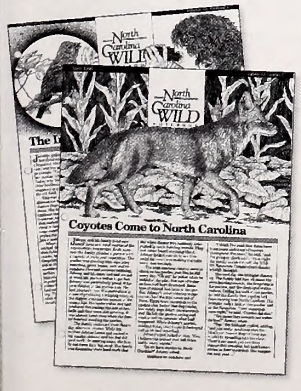


North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places book and posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16. ITEM CODE E6



N.C. WILD Notebooks

Each set contains eight issues of *North Carolina WILD Notebook*, the Wildlife Resources Commission's prize-winning conservation education newsletter.
$3 per set.

1995-1996 Set ITEM CODE E11
1996-1997 Set ITEM CODE E12

North Carolina WILD Journal

Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

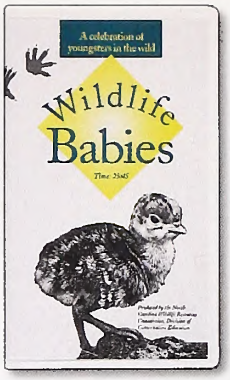
Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.
Cub & Boy Scout Correlation. ITEM CODE E9
Girl Scout Correlation. ITEM CODE E10

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.



Wildlife Babies

Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20. ITEM CODE **N9**

All Things Are Connected

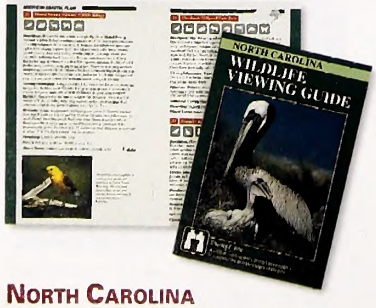
Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. $20.
ITEM CODE **W1**

This Land Is Sacred (Teacher's Guide)

Classroom activities to accompany All Things Are Connected video.
$4.50. ITEM CODE **W2**

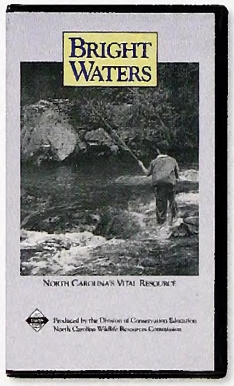
All Things Are Connected & This Land Is Sacred

Video and Teacher's Guide package. $22. ITEM CODE **W3**



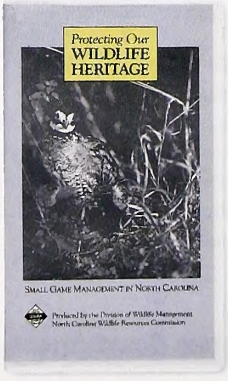
North Carolina Wildlife Viewing Guide

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95. ITEM CODE **N6**



Bright Waters (Video)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20. ITEM CODE **N7**



Protecting Our Wildlife Heritage (Video)

25-minute video offers useful tips for landowners on managing small game. $20. ITEM CODE **N8**

Gardens for Butterflies

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2. ITEM CODE **M5**

WILDLife Profiles

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. **$2 per set.**

Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard. ITEM CODE **W4**

Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar. ITEM CODE **W5**

Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, largemouth bass, black crappie, channel bass. ITEM CODE **W6**

Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon.
ITEM CODE **W7**

Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE **W8**

Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE **W9**

Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab.
ITEM CODE **W10**

Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE **W11**

Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE **W12**

Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE **W13**

Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE **W14**

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (_____) _____-_____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State _____ Zip _____-_____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

➜ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
➜ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
➜ (N.C. residents add 6% sales tax.) ..... **TAX**	$
➜ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
➜ (Add all items above.) ..... **TOTAL**	$

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE

(___) _____
Daytime Phone Number

_____
Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence
☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (___) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____
_____
_____
_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____
_____
_____
_____

☐ VISA ☐ MasterCard

Expires____/ _____ Acct. No. _____

Card Holder's Signature _____

MasterCard

VISA

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

Authorization Code Number

_____

Wishing you a reel happy holiday season.

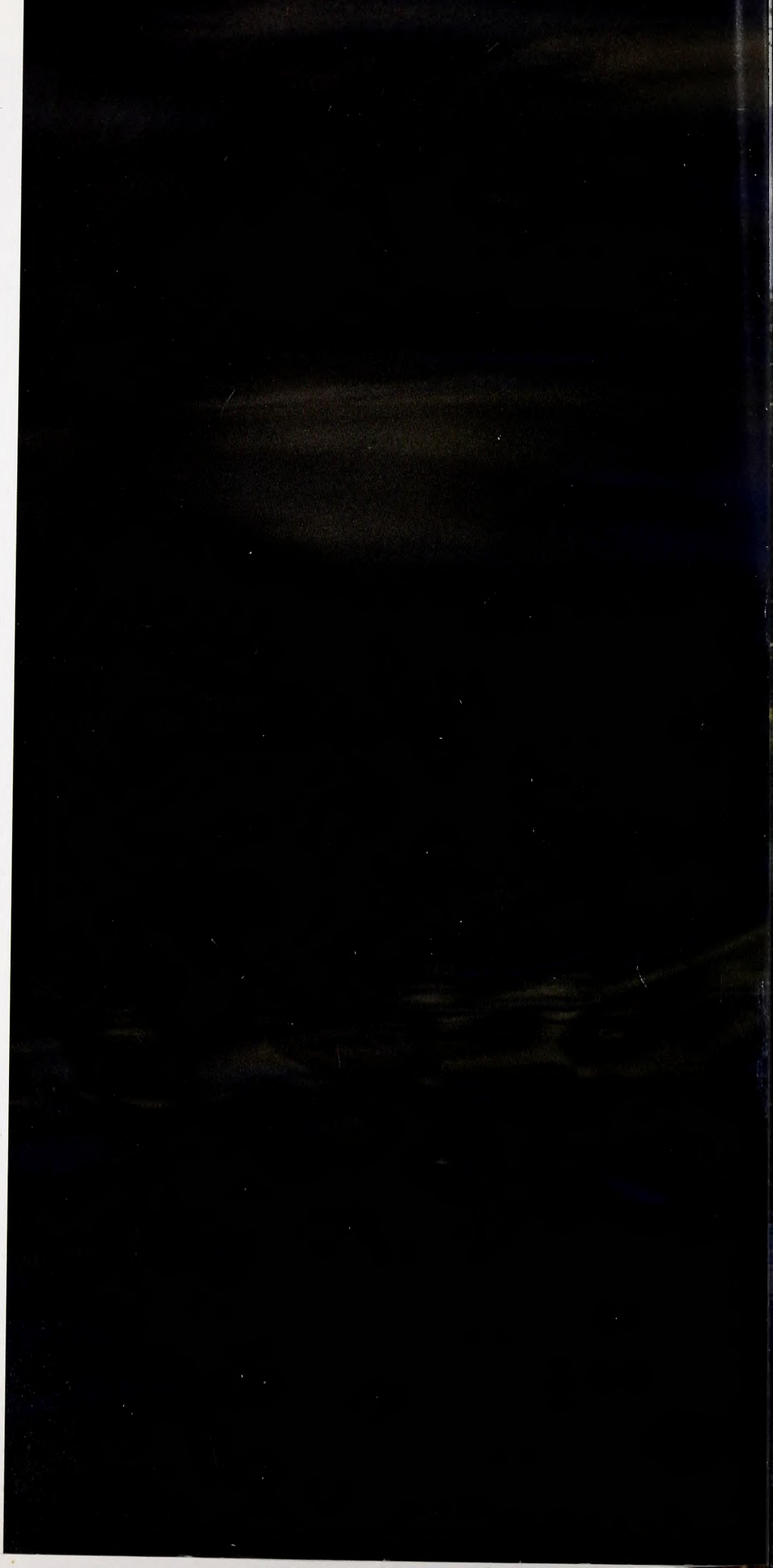
From the staff of

WILDLIFE IN NORTH CAROLINA

MELISSA McGAW

Ducks Back?

The continental duck population is in resurgence, with 92 million expected in the Atlantic Flyway this fall. Yet, some question whether these numbers are factual, or imaginary. For an analysis, read "Paper Ducks?" beginning on page 4. The green-winged teal is one of the species that's seen a growth in numbers.



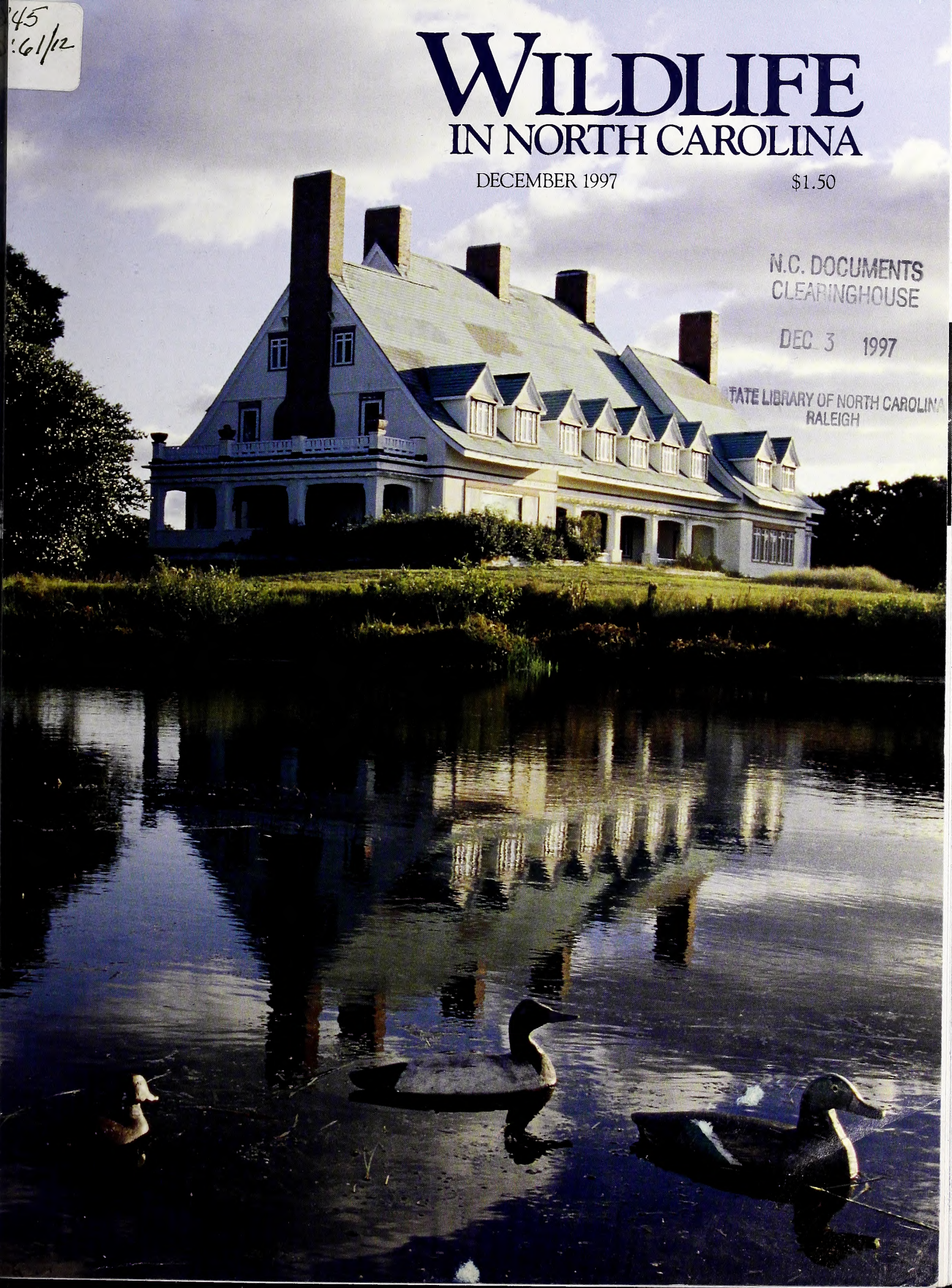
Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

345
:61/12

WILDLIFE IN NORTH CAROLINA

DECEMBER 1997 $1.50



N.C. DOCUMENTS CLEARINGHOUSE
DEC 3 1997
STATE LIBRARY OF NORTH CAROLINA
RALEIGH

Thinking About Animals, And Vice-Versa

by Jim Dean

ILLUSTRATED BY JACKIE PITTMAN ©1997

Do you look at your dog or cat and wonder what's going on in that head? Do you ask the same question about animals at a zoo? How about raccoons and squirrels that live in your neighborhood, or wild creatures of all sorts that live throughout the world? What about birds or fish? Few subjects are more provocative and humbling than speculating about what an animal is thinking, or capable of thinking, yet we all do it.

Early one morning this past summer, I spent the night at the farm and was awakened shortly after dawn by a large, honking flock of resident Canada geese that flew into the pond behind the cabin to feed. That is, by the way, a wonderful alarm clock. They became a bit nervous when I walked out on the porch and sat quietly in the rocker drinking coffee, but they soon settled down. After about 30 minutes, Curtis came up the path in his truck and I thought the flock would surely fly. Nope. They seemed totally unconcerned. Curtis pulled around the cabin and stopped. The geese ignored the truck, even though some of them had fed up through the pasture and were quite near.

They're accustomed to vehicles, I thought, figuring that they must believe a truck is some sort of animal, like the cows they also ignore. Then, Curtis got out of the truck. Instantly, the geese were in the air, honking warnings and headed for the horizon. If a goose thinks a truck is an animal, what must it think when an animal gets out of another animal? Wouldn't that scare the snot out of you? Did you see *Alien*?

This is quite normal stuff, of course. Deer aren't usually afraid of vehicles, nor are animals on the African plains. Indeed, squirrels aren't afraid of boats, and will let you drift within a few feet, but they recognize the threat the moment you put one boot on the bank. What, we ask, must all these animals be thinking?

Our pets are a constant source of such wonderment. You interrupt your cat's nap to get something, dumping fuzzface out of your lap onto the floor. Yet, even if you return immediately and pat your lap invitingly, does your companion forgive and hop up? Certainly not. It seems to sulk and refuses to look at you. If you persist, the cat will stare into the distance as though you were not there. It seems to be so obviously ignoring you—and that reaction is so human—that you conclude the cat is thinking, "Okay, so you didn't want me then, you don't get me now."

Anyone who has owned, trained and hunted bird dogs or other sporting breeds would have no problem believing that dogs can reason.

Biologists warn us that this is dangerous ground, and they're right to do so. It's impossible to understand what animals are capable of thinking, especially if we try to translate this into human terms. The accepted belief is that animals act more often on basic needs—hunger, for example—and that everyday functions are largely driven by instinct. The complex social functions of bees and ants are often cited as examples of instinct so refined that it often camouflages itself as rational thought. Indeed, the scientific community continues to debate whether higher animals are capable of reasoning like humans. Can some animals encounter a situation, think things through and evaluate options before making a considered decision?

Anyone who has owned, trained and hunted bird dogs or other sporting breeds would have no problem believing that dogs can reason. There are just too many occasions when no other explanation seems to suffice, although the evidence is purely anecdotal.

Havilah Babcock, who wrote such wonderful books as *My Health Is Better in November*, tells a hilarious story about one bird dog that was so exceptional that Babcock thought he might be able to train the dog to retrieve two quail at the same time. The dog wouldn't do it. Time and again there were opportunities until, finally, one day Babcock shot two birds on the other side of a deep, water-filled ditch. The dog crossed the ditch and brought the first bird to the edge. Then, it retrieved the second bird and laid it alongside the first. At last, thought Babcock, that dog is going to bring me both birds because it doesn't want to have to cross that ditch two extra times. But the dog found another solution. It ate one bird and brought Babcock the other.

Here's what I think. I strongly suspect that many higher animals may very well be capable of forms of reasoning, however primitive, that surpass pure instinct. My reasoning (if that's what humans do) is simply this: It's not that animals are human, it's that we are animals. No biologist is going to argue with that.

So your cat gets its feelings hurt and decides to punish you? Chances are you deserve it.

State of North Carolina
James B. Hunt Jr./Governor

Department of Environment, Health, and Natural Resources

Wayne McDevitt/Secretary

North Carolina Wildlife Resources Commission

Jim Bennett/Chairman/Greensboro
John E. Pechmann/Vice-Chairman/Fayetteville
C. J. Belch Jr./Roper
Cy W. Brame Jr./North Wilkesboro
Polie Cloninger/Dallas
John Coley/Holly Springs
Lawrence G. Diedrick/Rocky Mount
J. Robert Gordon/Laurinburg
Russell Maughan Hull Jr./Elizabeth City
John F. Lentz/Ellerbe
Joe Long/Mocksville
Charles R. Preston/Conover
Eugene Price/Goldsboro
Wes Seegars/Goldsboro
Bobby N. Setzer/Cullowhee
W. Ray White/Manteo
Arthur J. Williams, III/Washington

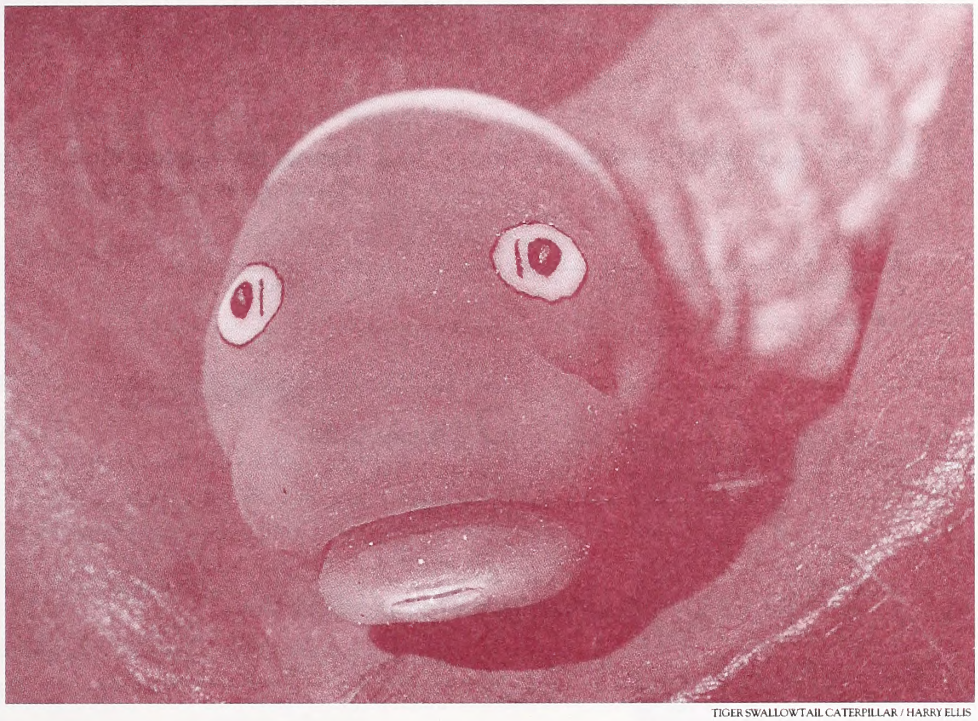
Charles R. Fullwood/Executive Director
Richard B. Hamilton/Assistant Director
Larry A. Campbell/Equal Opportunity Officer
Bodie McDowell/Public Information Officer

Division Chiefs

Col. R. M. Tatum/Enforcement
Fred A. Harris/Boating and Inland Fisheries
Hal S. Atkinson Jr./Wildlife Management
Cecilia Edgar/Administrative Services
A. Sidney Baynes/Conservation Education
Gordon S. Myers/Engineering Services

Magazine Staff

A. Sidney Baynes/Division Chief
Randy Cotten/Assistant Division Chief
Jim Dean/Editor
Kimberly K.C. Schott/Interim Art Director
Lawrence S. Earley/Associate Editor
Rodney Foushee/Assistant Editor
Erin S. Hancock/Graphic Designer
Debra C. Sutton/Typographer
Ken Taylor/Chief Photographer
Melissa McGaw/Photographer
Sherry Outlaw/Sales & Marketing Coordinator
Theresa Castro/Circulation Manager
Ginger Williams, Shay DeLuca/Staff Assistants



TIGER SWALLOWTAIL CATERPILLAR / HARRY ELLIS

Want to see something *wild*?

Subscribe to

WILDLIFE IN NORTH CAROLINA

Take a close look at this issue. We've gotten bigger–eight pages bigger. And that's not all. We've got a new table of contents page that's brighter and easier to read, and we've made subtle changes in other departments to make them more inviting. We've also redesigned the N.C. WILD Store catalog and our subscription forms and made them part of our regular pages so that they're more user friendly.

Best of all, there's a new feature to help youngsters learn about the curiosities of our natural world–we think adults will like it, too. Teachers may recognize it as the award-winning N.C. WILD Notebook. Now everyone can enjoy it, and it will appear 12 times a year instead of just through the school months.

But we haven't changed everything. Every month, we'll still bring you great color photos and all those interesting articles about North Carolina's wonderful wildlife, unique natural places, fishing, hunting, outdoor recreation, wildlife management and threats to our environment. All that, and more.

Oh yes, one more thing. The price is still $7.50 a year including postage–a fraction of what you'd pay for most magazines. Isn't that a great deal? Want an even better one? How about three years for $20, or a lifetime subscription for $100?

Now isn't that wild, and wonderful?

MAGAZINE SUBSCRIPTION FORMS ☞

MAGAZINE SUBSCRIPTION ORDER FORM

FW97-98

Yes! ❑ **Enter my subscription.** ❑ **Renew my subscription.**
(If renewal, attach recent magazine label.)

WILDLIFE IN NORTH CAROLINA

Name _____ Home phone (___ ___ ___) ___ ___ ___ - ___ ___ ___ ___
first name MI last name area code

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **MAGAZINE SUBTOTAL** **$**

Yes! ❑ **Send a gift subscription to the folks below.**

Gift Subscription From _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip _____

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100

Gift Subscription To _____
first name MI last name

Mailing Address _____

City _____ State ___ ___ Zip ___ ___ ___ ___ ___ - ___ ___ ___ ___

○ 1 year $7.50 ○ 3 years $20 ○ Lifetime $100 → **GIFT SUBSCRIPTION SUBTOTAL** **$**

→ **MAGAZINE AND GIFT SUBSCRIPTIONS TOTAL** **$**

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: *Wildlife in North Carolina*, PO Box 29607, Raleigh, N.C. 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 6-8 weeks for delivery on all magazine subscriptions. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Subscriptions may be purchased at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

MasterCard VISA *For credit card orders, provide information below.*

CREDIT CARD NUMBER

EXP. DATE ( ) _____
Daytime Phone Number

_____
Credit Card holder's signature

Moving? If you are a current *Wildlife in North Carolina* magazine subscriber planning to move to a new address, let us know two months in advance so you won't miss a single issue. Enclose the following information in the envelope provided.

Old Address: Attach a recent magazine label or copy old address as it appears on label.

CODE _____ CODE _____
Name _____
Address _____
City _____ State _____ Zip _____

New Address: Fill in below.
Name _____
Address _____
City _____ State _____ Zip _____

Contents

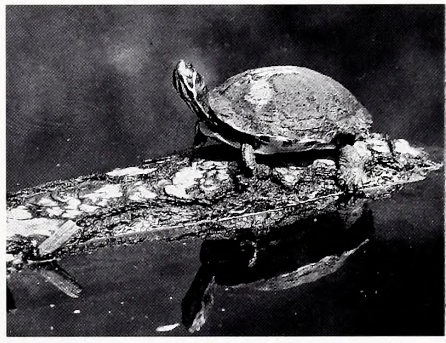
WILDLIFE IN NORTH CAROLINA

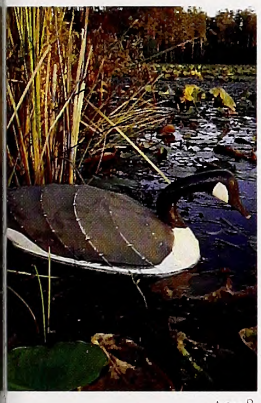
Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

December 1997 *Volume 61, Number 12*

Features

4 **Gorged on Geese** *written by Rodney Foushee*
photographed by F. Eugene Hester ©1997
Once threatened by overhunting and wetland destruction, snow goose populations have rebounded in the past 25 years to the point that the birds are destroying their fragile Arctic breeding grounds.


page 18


page 8

8 **North Carolina's Historic Waterfowl Decoys**
written by Neal Conoley ©1997
photographed by Ken Taylor and Melissa McGaw
Old handmade wooden decoys have become collectible folk art, and North Carolina's early makers are held in high regard.

14 **For Pete's Sake** *written by Mike Gaddis* ©1997
illustrated by Jim Brown ©1997
It took me years to recognize it, but Dad's legacy was there all along.

18 **The Bull Neck of Heart's Delight**
written by Bland Simpson ©1997
photographed by Ken Taylor
This handsome 5,000-acre swamp forest bordering the Scuppernong River and Albemarle Sound is a sterling addition to our coastal preserves.

24 **Carolina Cooldown** *written by Carla Burgess* ©1997
Few animals in North Carolina hibernate in the truest sense of the word. Instead, they take a series of extended naps.

Departments

Our Natural Heritage *by Jim Dean* ..... **inside cover**
Nature's Ways *by Lawrence S. Earley* **2**
N.C. WILD Notebook *by Consie Powell* **28**
Back Porch *by Rodney Foushee* **32**

Cover *Decoy carving is an old and respected craft in the eastern counties of the state. Behind these classic decoys sits the Currituck Wildlife Museum at the Whalehead Club. Photographed by Ken Taylor.*

page 28

Wildlife in North Carolina (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Periodicals postage paid at Raleigh, N. C. and other offices. Subscription rates: one year $7.50, three years $20, Lifetime $100. For subscriptions from foreign countries, payment **only** by U.S. Postal Service money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, *Wildlife in North Carolina*, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-662-4377. Articles in *Wildlife in North Carolina* may represent the personal views of authors, and do not imply endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

Vertical Birds

written by Lawrence S. Earley
illustrated by David Williams

There are about 250 species of tree-perching songbirds in North America, and almost every one of them has adapted to the horizontal dimension of the tree. These are birds that perch on limbs, branches and twigs to rest, sleep, breed and hunt.

Relatively few of these birds have adapted to the vertical dimension of the tree trunk. This may be surprising because it's a dimension that offers a fair number of niches and a rich supply of ants, beetles, grubs, spiders and other delectibles. And, relatively speaking, there's not a lot of competition there. Indeed, only six songbird species have taken to life on a tree trunk. Among them are four nuthatches, the black-and-white warbler and the brown creeper.

Of course, any bird that would do so must solve one of life's most unforgiving laws—the law of gravity. Among the few songbirds that have done this successfully are the nuthatches. With their tiny bodies, large feet and long, curved toes, these birds can grip the bark of a tree trunk, climb up, down and sideways and even hang upside down. Their long, thin beaks can snatch ants and spiders out of crevices and other hiding places on the bark. But in many respects their legs are very much like the leg of any perching songbird—three toes pointing to the front, a single toe pointing to the rear. As a result, nuthatches most often cling to trees sideways, with the topmost foot actually grasping the tree and the bottom foot providing support.

The black-and-white warbler and the brown creeper are also equipped with large feet and toes, and they spend most of their time harvesting insects from tree trunks.

Of all birds, however, the woodpeckers have the most impressive adaptations to a vertical life. One of these adaptations is a very different foot structure than the one possessed by nuthatches and other perching birds. Woodpeckers have evolved a foot with two toes to the front and two toes to the rear. This by itself wouldn't necessarily give them more of an advantage in negotiating vertical tree trunks than the three-toes-to-the-front-and-one-toe-to-the-rear structure, except that in some species (notably pileated woodpeckers and flickers) one of the rear toes can slide to the outside when perching. This is what improves their grip on the bark and enables them to forage more easily.

Another important woodpecker adaptation is the evolution of the tail into a sturdy prop. Nuthatches have such small tails that they can't be used for support, and indeed a larger size tail might well impede their ability to scoot up, back down and hang upside down. The tail feathers of woodpeckers, however, have a strong shaft which can support the body and they are tougher than other feathers, a necessity for the use that they get in pressing against rough bark.

The very instinct of pecking wood depends on the tail being available for use as a prop. The tail steadies the woodpecker so it can rotate its body backward and forward rapidly and with great force. This provides the power behind the pecking, enabling the bird to drill through bark, and into the rotten recesses of a dead limb to create its cavity or to uncover the insect food that lies beneath. Several other body structures contribute to the bird's pecking ability, including the strong, chisel-shaped bill and the reinforced skull that can cushion the hammering force of the blows.

Even the woodpecker's tongue is a wonderful specialization that supports its prowess on the vertical plane. Woodpeckers' tongues are quite long. In some species they wrap around the inside of the skull and, when extended, may protrude several inches beyond the bill. They are also covered with mucus and tipped with spines. As a result of this fantastic organ, the birds can probe the inner recesses of bark and wood to lap up and sometimes impale a tasty ant or grub.

Life on a tree trunk makes nonnegotiable demands on both body and behavior, and the woodpeckers have answered them in spectacular fashion. As a result, they claim nearly solitary possession of a fruitful and rewarding habitat.

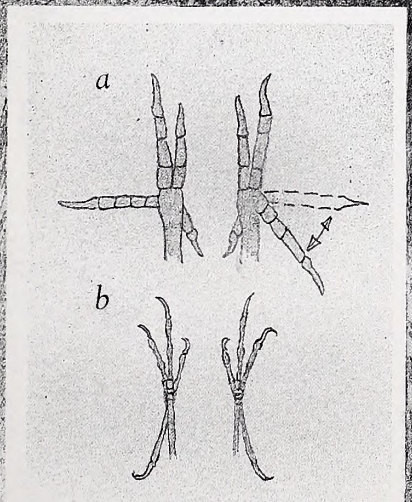
Other Reading

- See "What is a Woodpecker?" in Robert W. McFarlane's *A Stillness in the Pines: The Ecology of the Red-cockaded Woodpecker* (W.W. Norton & Co., 1992).

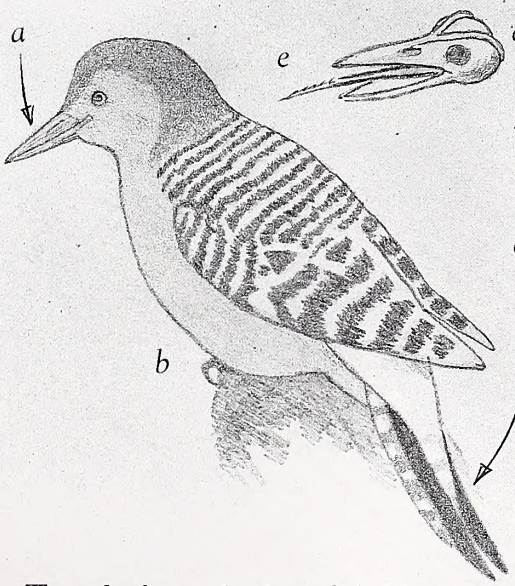
Surfing the Web

- See the Ornithology Website which is "dedicated to the education of bird ecology and conservation." *Address:* http://mgfx.com/bird/
- For an article on the northern flicker containing range map, migration routes, and other natural history information, see the *Birds of North America* website. *Address:* http://www.acnatsci.org/bna/excerpts/flicker.html#migration
- For links to many sites on birds and the study of ornithology, look at the Electronic Resources on Ornithology web site. *Address:* http://www.chebucto.ns.ca/Environment/NHR/bird.html. Also the bird website at the Smithsonian Institution in Washington, D.C., can be very helpful. *Address:* http://nmnhwww.si.edu/vert/birds/brdsites.html

Woodpeckers and nuthatches *are adapted to clinging to tree trunks, but in different ways. This red-headed woodpecker has developed a fantastic array of adaptations that has made it, and its woodpecker kin, masters of the vertical dimension.*

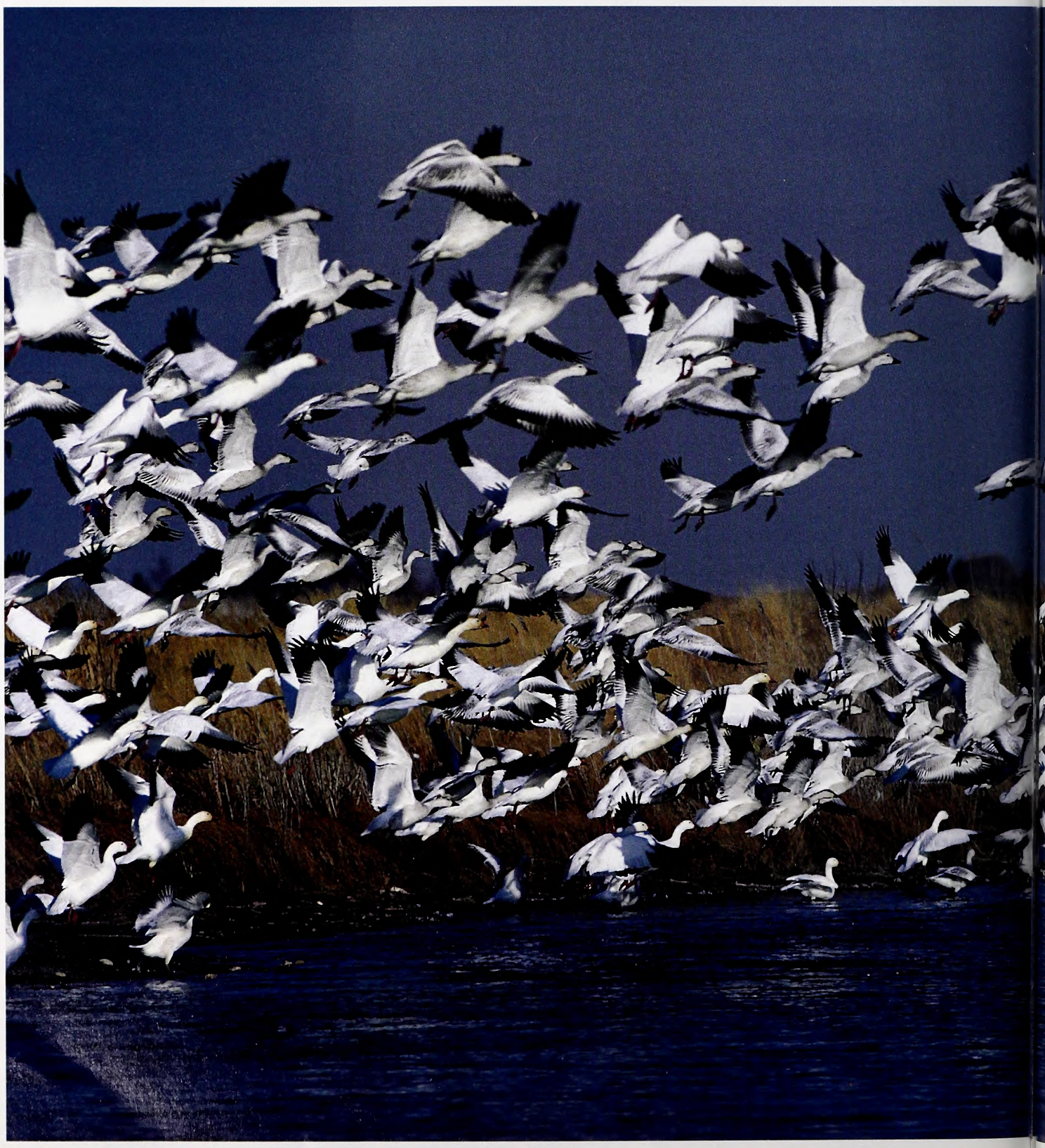


Red-bellied woodpeckers *(a) show a typical woodpecker arrangement—two toes to the front and two to the rear. One of the rear toes can extend to the outside, giving the bird a stronger grip on the tree. Nuthatches (b) have three front toes and a long rear toe.*



The tools of a woodpecker *include: (a) a strong, chisel-like bill; (b) toes that spread to grip the tree; (c) a sturdy tail to support the bird; d) a thickened skull; (e) and an extensible tongue.*

Gorged on Geese



Once threatened by overhunting and wetland destruction, snow goose populations have rebounded in the past 25 years to the point that the birds are destroying their fragile Arctic breeding grounds.

written by Rodney Foushee / photographed by F. Eugene Hester ©1997

The sun had been up for several hours before we noticed the first wave of snow geese that February morning. Their loud calls gave the birds away long before we spotted them outlined against the gray Carolina sky.

It is an awesome spectacle to watch a flock of hundreds of boisterous snow geese move as one. Driven by a singular purpose, white geese don't fly in orderly wedges like Canadas but, instead, form huge wavering lines that slowly dip and rise in a peculiar rhythm. A Hyde County wheat field proved the perfect landing zone for the snow geese, which immediately began gorging themselves on the tender young leaves.

Once rare, such scenes are becoming increasingly common throughout northeastern North Carolina, as in much of the United States. In the past, snow goose populations were limited by the quantity and quality of their main natural food source—marsh grasses and shoots. But the conversion of forests to cropland in the past few decades has provided the birds with an ample alternate food source to fatten them up for the long flight north in the spring. Additionally, the protection afforded by wildlife refuges along major migration routes and the birds' natural wariness of hunters have helped the flocks flourish.

As a result, many more snow geese are surviving to breed successfully in the Arctic. While they are only a minor nuisance to Tar Heel farmers and landowners, these burgeoning flocks of snow geese are wreaking havoc on their fragile nesting grounds thousands of miles to the north. In many cases, multitudes of the ravenous birds and their offspring are eating away everything in sight —altering the landscape to such a degree that scientists believe it may take hundreds of years for some of the worst areas to recover. Wildlife managers in Canada and the United States have recognized and begun to address this problem only late in the game.

***Once rare, huge flocks** of snow geese have become a common sight in northeastern North Carolina and elsewhere. While just a nuisance to farmers, the birds are wreaking havoc on their Arctic nesting grounds. Wildlife managers will soon have to make some hard decisions to deal with this increasing overabundance.*

***Eight decoys is** barely a start at attracting the attention of hundreds of snow geese. Despite their abundance, the birds' habit of flying in huge flocks and their uncanny wariness of humans have made them tough targets for hunters.*

Population Explosion

Snow geese, like many other North American waterfowl species, suffered tremendous losses during the late 19th and early 20th centuries due to unrestricted market hunting and weak-to-nonexistent wildlife enforcement laws. Greater snow geese—the predominant species along the Atlantic Seaboard—were some of the hardest hit waterfowl. By the early 1900s, the entire continental population of greater snows numbered around 3,000 birds.

Despite the implementation of the Migratory Bird Treaty Act in 1918, snow goose populations were slow to rebound. By the mid-1930s, increased wetland destruction and lagging numbers led wildlife managers to close the hunting season on snow geese along much of the East Coast, including North Carolina. In the 40 years that passed before the hunting season finally reopened in the Tar Heel State, the birds underwent a miraculous comeback—thanks in great part to the conversion of hundreds of thousands of acres of forests to farmland.

"Snow geese have historically used marshes for food, which has limited their populations," said Dennis Luszcz, the N.C. Wildlife Commission's Waterfowl Project Leader. "But their recent switch to agricultural fields has given the birds unlimited wintering habitat with high-quality food. We are sending them back to the breeding grounds in much better shape, which has increased their overall productivity."

During that reopened hunting season in 1975, an estimated 165,000 greater snows were calling the Atlantic Flyway home—up from less than 50,000 birds 10 years earlier. Wildlife managers at the time were hopeful hunting pressure could check the rising population at a manageable level—around 200,000 geese. Sportsmen initially viewed the new quarry as a welcomed hunting resource.

For the first few years, hunters in northeastern North Carolina were fairly successful at taking snow geese. Both Currituck Sound and the Pea Island National Wildlife Refuge on the Outer Banks held tremendous numbers of wintering snows, most of which had never heard the sound of a shotgun. While the birds could be fooled into landing by using white diapers and rags as decoys, many hunters were able to fill their limits by simply waiting in an appropriate field for hundreds of the geese to land.

But the birds, like other white goose species, quickly developed an uncanny wariness of hunters. Within only a few years, the geese learned to avoid human contact by changing their feeding locations often. And their habit of flying in huge flocks made it increasingly difficult to attract them to detailed decoys, even when dozens of full-bodied snow goose replicas were used. The birds soon developed such a reputation for unpredictability and stubbornness that many hunters gave them up to pursue more "decoy-friendly" goose and duck species.

"Since snow geese move in such huge flocks, it's hard for hunters to even begin to grab their attention unless they use large numbers of decoys," Luszcz said. "Snow geese just don't decoy well, and so they have very little vulnerability to hunting."

As a result, hunting success for snow geese in North Carolina is low and the effort light in much of the northeastern section of the state, where they winter. The few notable exceptions are near Pungo Lake, Oregon Inlet and Currituck Sound, where a few guides occasionally take snow geese.

Based on the time and effort required to find and decoy snow geese, Luszcz considers the birds the most difficult North Carolina waterfowl species to pursue. "There is a lot of futility in hunting snow geese," he explains. "Most hunters enjoy a challenge, but if you have no success, you eventually look to other pursuits. After going out repeatedly without firing a shot, you eventually become discouraged and quit."

Similar lack of success has affected hunters in other East Coast states. Despite increasingly liberal bag limits and hunting seasons over the past 20 years, snow goose harvest rates have steadily declined, while greater snow populations along the Atlantic Flyway have continued their meteoric rise. Greater snow goose numbers now exceed 600,000, with about 30,000 birds wintering in North Carolina each year. That number is expected to increase unless drastic measures are taken.

Different Geese—Similar Problems

So, 30,000 geese wintering in North Carolina doesn't sound like much of a worry? Think again. The problem can get much worse.

The Arctic goose population explosion is unique to neither the Tar Heel State nor the Atlantic Flyway. In fact, much media attention has been focused on another white goose subspecies that concentrates its migrations in central and western North America—the lesser snow goose.

By far, the worst case involves midcontinent lesser snow geese, which number somewhere between 3.5 and 5 million birds—a 300 percent increase over the past 25 years. The sheer number of these lesser snows and their impact on their fragile northern

breeding grounds have made them the top priority of the Arctic Goose Habitat Working Group—a group of scientists and wildlife managers representing both government and private conservation agencies in the United States and Canada.

Far from just overgrazing marsh and tundra grasses on the breeding grounds, record numbers of lesser snow geese have altered the landscape to the point that it may take decades for many areas to recover. Some of the worst-damaged areas have been picked so clean by the geese that little more than Arctic deserts remain. Scientists doubt these areas will ever recover. With nearly all major breeding areas showing habitat destruction and goose numbers on the rise, lesser snows are spreading out to nontraditional breeding areas to provide food for their goslings. The damage to this Arctic habitat, used by dozens of other wildlife species, is so extensive that the Arctic Goose Habitat Working Group has deemed the situation an "ecosystem in peril."

The problem is severe enough that the Working Group has made some drastic recommendations aimed at reducing midcontinent snow goose populations to half the current level by 2005. Among the recommendations: 1) legalize the use of electronic calling devices and baiting for snow goose hunting; 2) open refuges up to increased snow goose hunting; 3) encourage native Canadians to harvest more white geese and remove restrictions on taking eggs; 4) extend the hunting season for midcontinent snow geese beyond the March 10 closing date established by the Migratory Bird Treaty Act.

Snow Goose Ghetto

While North Carolina has a small population of about 3,000 lesser snow geese that winter at Lake Mattamuskeet, it's the explosion in greater snow numbers that has East Coast wildlife managers worried. Since the mid 1980s, greater snow geese have caused increasing damage to coastal marshes and agricultural fields along the Atlantic Flyway. Most notably, greater snows have picked clean huge patches in the marshes of the St. Lawrence River, where the birds stage before making the final leg of their spring migration. These sensitive areas are also used by black ducks.

Greater snow geese have damaged crops along the flyway, with nearly $1 million in hay damage reported last year in Canada. The birds graze on wheat and other grain crops in the United States and have caused minor damage in North Carolina, where they have altered the species composition of some salt marshes.

The large numbers of greater snow geese are causing some overgrazing problems to their Arctic breeding grounds and are beginning to use up the choicest foods. But unlike lesser snow geese, the larger birds use less sensitive Arctic upland areas and have caused no permanent damage so far. "The breeding habitat for greater snow geese seems to be rebounding, but the quality of the habitat is deteriorating," Luszcz said. "The body weights of the birds coming off the breeding grounds are falling."

Austin Reed, a biologist with the Canadian Wildlife Service, describes the breeding grounds as turning into a "snow goose ghetto"—the young birds just do not have the benefits of top-quality habitat.

Tough Choices

Wildlife managers were preparing greater snow goose management recommendations this past fall, but much of the focus and urgency is still on lesser snow geese.

"The greater snow goose problem is waiting in the wings," said Jerry Serie, the U.S. Fish and Wildlife Service's Atlantic Flyway representative. "We are focusing on the lesser snow geese right now, but we recognize the fact that greater snow geese populations have increased dramatically over the past decade."

The Fish and Wildlife Service began conducting a series of hearings in August in the Central and Mississippi flyways to bring wildlife managers and the public together to come up with some acceptable plans to reduce lesser snow goose populations. Wildlife managers hope to begin implementing the snow goose reduction plans by next year with public support. "The greater snow goose population will be reviewed in detail after the lesser snow goose issue is dealt with," Serie said. "Once we can find some successful methods to check these midcontinent goose populations, we may be able to apply similar strategies to the Atlantic Flyway."

Whatever the outcome, wildlife managers and hunters will have to deal with some tough ethical issues to reduce the numbers of snow geese by millions. Many of the proposals—such as hunting past the March 10 closing date and using bait—would involve exceeding waterfowl management regulations that have been in effect for decades.

"There are no easy answers," Serie said. "I don't think anybody wants to consider snow geese a devalued resource. In terms of ethics, one of the biggest questions is: 'Do you resort to commercial take methods to reduce the numbers?'"

For many hunters, using bait and electronic calls may be unacceptable. But without drastic measures, most biologists believe some Arctic ecosystems will soon collapse.

In many ways, the hunter is caught in the middle on the issue.

"We are asking the hunter to solve this problem, although it is not the hunter's fault," Serie said. "The changes in agricultural practices have changed the birds' ecology and health. But as managers, we have to find creative ways to reduce snow goose survival rates."

Wildlife managers in North Carolina—like those in most Atlantic Flyway states—are faced with making tough choices concerning greater snow geese, given the glaring destruction their smaller cousins are already causing to their Arctic breeding grounds.

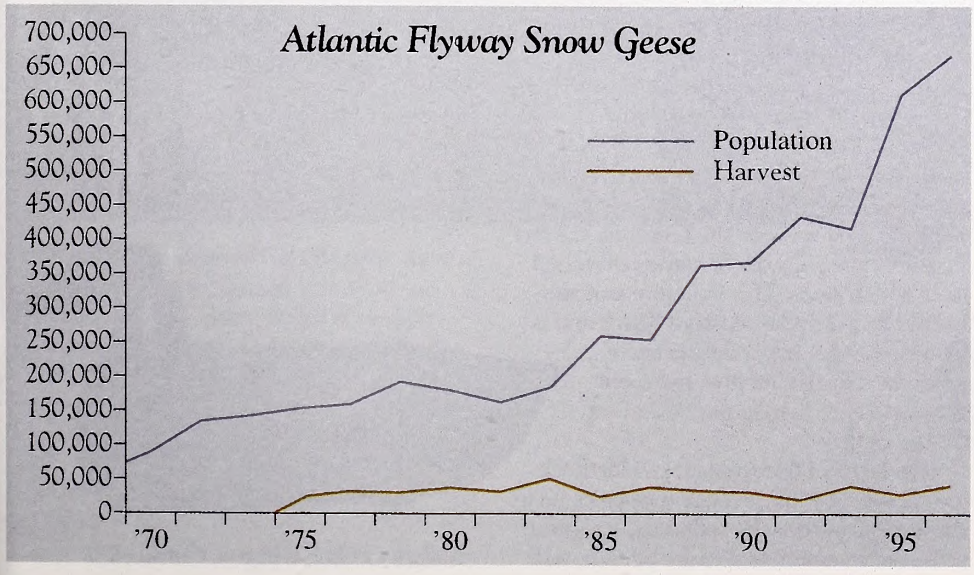
"This is a serious wildlife issue for North Carolina and the entire flyway," Luszcz said. "This is nothing to be taken lightly."

But fundamental questions about how far managers and the public are willing to go to reduce goose numbers still remain.

"Do we sit by and watch the snow goose populations destroy the habitat?" Luszcz asks. "Or do we jump in and do whatever it takes to protect this tundra habitat?"

In the coming months we will find out. ☒

SOURCES: U.S. FISH & WILDLIFE SERVICE, CANADIAN WILDLIFE SERVICE



Ned Burgess, Canvasback, Currituck

North Carolina's Historic Waterfowl Decoys

Old handmade wooden decoys have become collectible folk art, and North Carolina's early makers are held in high regard.

written by Neal Conoley ©1997
photographed by Ken Taylor and Melissa McGaw

Currituck Sound. Pamlico Sound. Lake Mattamuskeet. Core Sound. These are names that carry powerful messages to waterfowl hunters, triggering mental images of gray winter days, stake blinds, decoys and tremendous flocks of low-flying ducks. Equally illustrious is another group of resonant names—John Williams, Ned Burgess, Alvirah Wright, Mannie Haywood and Mitchell Fulcher, every one of them a great North Carolina decoy carver, their common bond a love for the waterfowling experience and heritage.

Little wonder such accomplished craftsmen developed in North Carolina. The eastern part of the state is soggy with marshes, shallow sounds, numerous lakes, rivers and creeks, all providing abundant food and shelter for wintering waterfowl. The greatest concentrations of ducks and geese historically occurred in Currituck, Dare, Hyde and Carteret counties. That's where most of the hunting took place and where most of the decoys were made and used. The majority of our famous decoy makers came from these four counties.

Currituck County

"Land of the Wild Goose"

Most of the decoys made in Currituck County have one common characteristic: ruggedness. They were subjected to hard use both on the rough, icy waters of Currituck Sound and during the off-season, when hunters paid little attention to their decoy rigs. Longtime Currituck waterman Capt. Elijah Tate recalls days on the dock when guides would pull their skiffs to shore, throw their decoys into a pile on the bank and leave them until the next season. If they were still there the next year, a new coat of paint was added and they were ready to go. This wear and tear helps explain why so many Currituck decoys are found with overpaint, replaced heads, broken bills and patched necks.

Much of the hunting in Currituck was done on open water, where large decoy rigs were necessary. A typical stand of decoys for diving ducks included over 200 ducks and 20 geese. With juniper bodies, keel weights and anchors, these decoys would weigh more than 1,200 pounds. This was quite a load for both the skiff and the hunter who had to handle them. To reduce the strain, Currituck carvers began to make decoys of canvas stretched over wire frames. This structure was supported by a wooden bottom board and a wooden head. Canvas decoys are not unique to North Carolina, but more are found here than in any other part of the country.

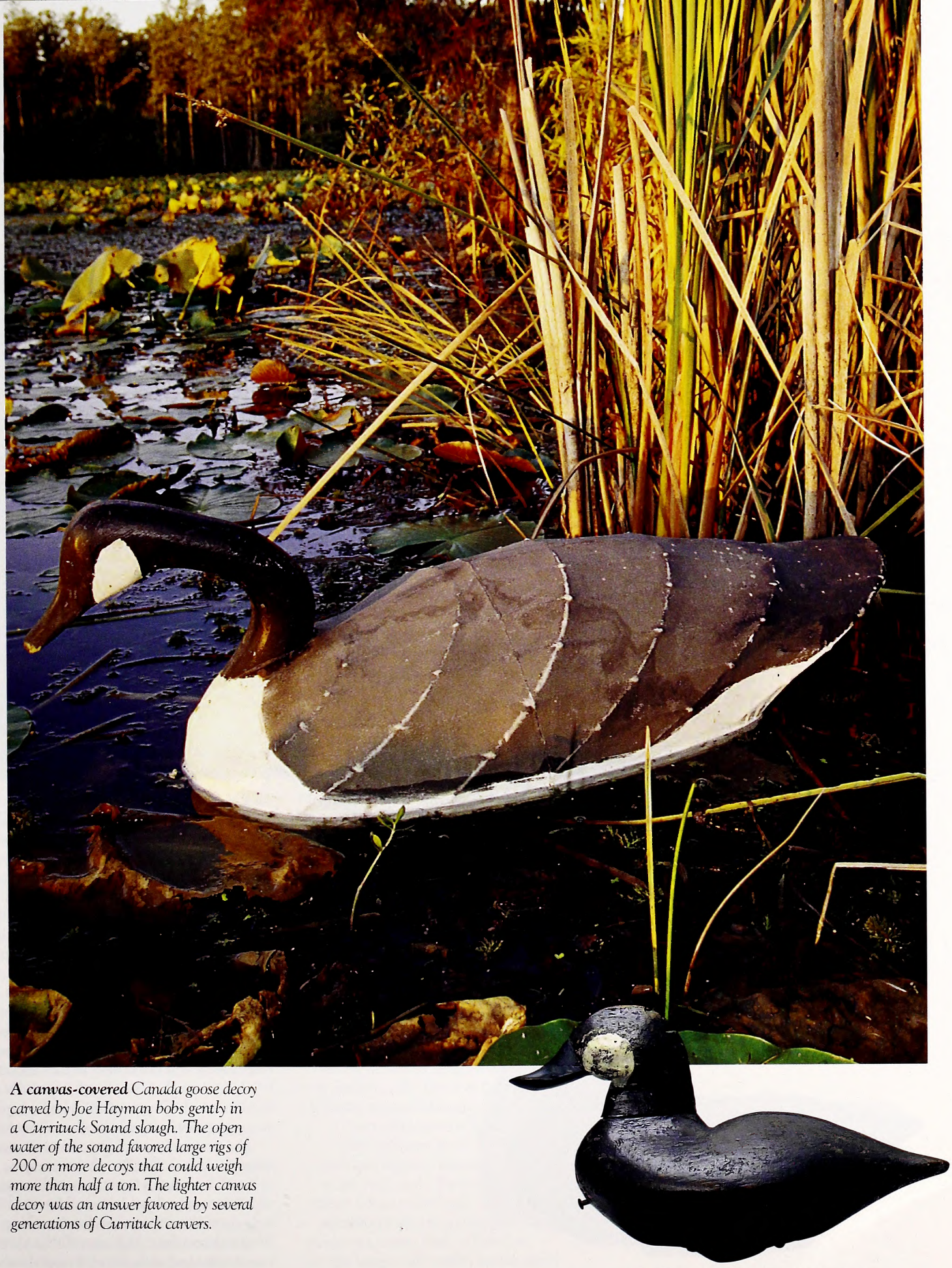
The kinds of decoys made in Currituck are consistent with the duck species found in the area. Canvasbacks, redheads, scaup and geese are common, and so are pintails, widgeons, black ducks and mallards, though in lesser numbers. Ruddy duck, coot and swan decoys are all found in Currituck in greater numbers than in other locations. These rare kinds of decoys are highly prized by collectors.

Ned Burgess probably carved more decoys than any other Currituck maker. His style is simple yet elegant. Burgess decoys have classy, high heads carefully fitted onto boat-shaped bodies. He made decoys from about 1920 through 1945, and his carvings included most species of ducks, geese and swans. His coot decoys, with their unusual head positions, are among the most interesting decoys found in North Carolina.

Wallace O'Neal and Joe Hayman were accomplished boat builders, guides and decoy makers during the 1930s through the 1950s. They constructed large juniper decoys that exemplified the Currituck style. Hayman made hundreds of canvas goose decoys and a few swan decoys. O'Neal made large stands of decoys for hunting diving ducks in open water.

Currituck carvers took advantage of their local resources to make stylish yet functional decoys. We are fortunate to have many fine examples of this "waterfowl art."

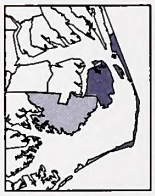
Wallace O'Neal, Widgeon, Currituck



A canvas-covered *Canada goose decoy carved by Joe Hayman bobs gently in a Currituck Sound slough. The open water of the sound favored large rigs of 200 or more decoys that could weigh more than half a ton. The lighter canvas decoy was an answer favored by several generations of Currituck carvers.*

John Williams, Ruddy Duck, Currituck

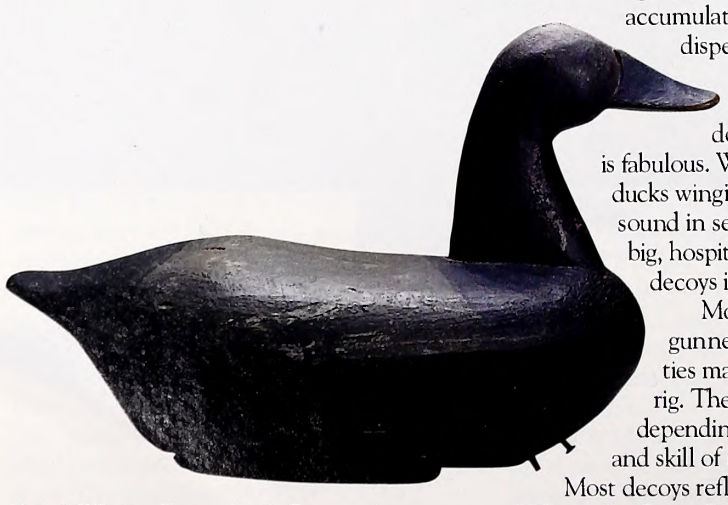
Gary Bragg's *"roothead" goose decoy nestles amongst a group of cypress knees. Dare and Hyde county carvers made these distinctive decoys from the wood of cypress, cedar or Atlantic white cedar trees.*



Dare and Hyde Counties
"Big Waters"

Every waterfowl hunter knows that big water calls for big stands of decoys. This is particularly true for Dare and Hyde counties, where the sounds are expansive. Ducks and geese often accumulate in large rafts and are dispersed only by rough weather, but when the storm clouds do roll in, the gunning is fabulous. With small groups of ducks winging up and down the sound in search of company, a big, hospitable-looking stand of decoys is very effective.

Most everyone who gunned in these two counties made their own decoy rig. Their styles varied widely, depending on the knowledge and skill of each particular maker. Most decoys reflect the rugged nature of life on the Outer Banks.

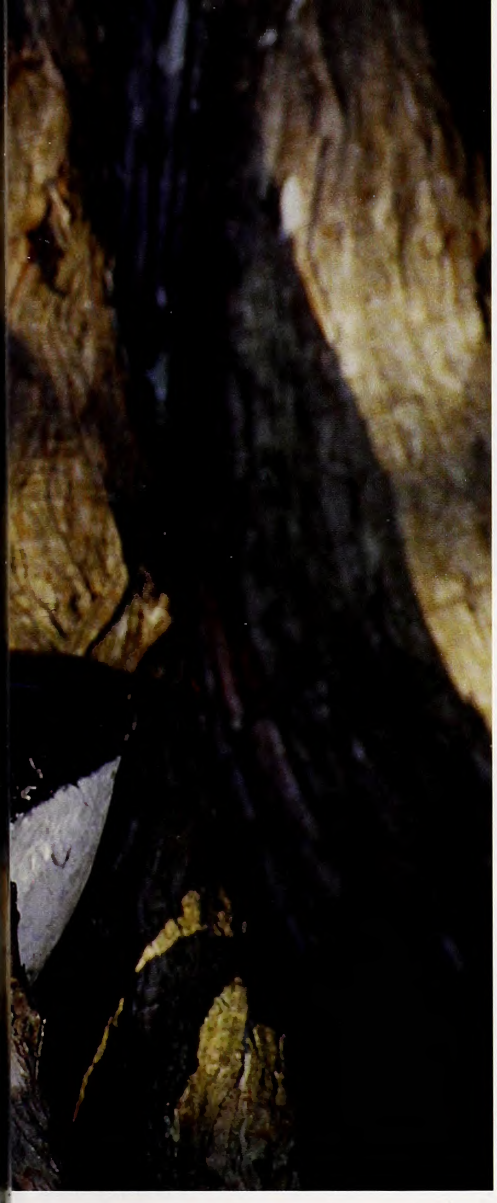


Alvirah Wright, Canvasback, Dare

The decoys in Dare and Hyde counties, like those in Currituck, resemble boats. They are made of juniper, cypress or any other material that could be found or scrounged. Telegraph poles, ships' masts washed up on the beach and even cork life rafts were all used for decoys. Some of the most beautiful of all North Carolina decoys were made in these two counties from these odd materials.

Of particular interest are decoys that have heads fashioned from cedar, gum or cypress roots. These roots, or knees, were carefully selected by the maker to resemble the species for which the decoy was designed. Roots are particularly effective as decoy heads because they are almost impossible to break or crack. Decoys with roots for heads are appropriately called "roothead" decoys.

The northern end of Dare County was home to Alvirah Wright, who made some of North Carolina's finest decoys. He was widely recognized as a boat builder, and his style carried over into his decoy making. Wright decoys have high, graceful heads with large bodies and wide, hand-chopped tails. Examples that remain today depict the



courtesy of Ned Cowden

ultimate in style, grace and workmanship. His decoys date from the early 1900s.

Other carvers were Mannie Haywood, Marvin Midgett and the Tilletts from Kitty Hawk, who made hundreds of canvas geese, ducks and swan during the 1920s and 1930s for use in Currituck and Dare counties. They made more decoys for sale to sportsmen than any of the other North Carolina makers.

In Hyde County, the famous decoy makers included Capt. Gary Bragg from Ocracoke. He made a number of "roothead" goose and brant decoys around the turn of the century. Stanley Wahab, George O'Neal and Charlie McWilliams also carved decoys from their workshops on Ocracoke Island during the early 1900s.

Percy Carawan made some of the most realistic "roothead" goose and swan decoys ever constructed. He guided on Lake Mattamuskeet and hunted the marshes of Dare and Hyde counties. During the late 1930s, Carawan made several rigs of wooden geese for other local hunters. He collected black gum roots from freshwater swamps and carefully crafted them into unusual head positions.

Ab Wescott, Cork Pintail, Dare

Alvirah Wright, Ruddy Duck, Dare

Percy Carawan, Roothead Goose, Hyde

The Legacy Continues

Waterfowl enthusiasts and decoy collectors are preserving the tradition through two important museum efforts in Currituck and Carteret counties. The Currituck Wildlife Museum at the Whalehead Club has a dual purpose—to collect and preserve waterfowling artifacts and to restore the historic Whalehead Club. The Core Sound Waterfowl Museum on Harkers Island will preserve and interpret the waterfowling history of Carteret County. These projects will insure that future generations can enjoy our waterfowling heritage.

Currituck Wildlife Museum—Open June-Sept., 10-4 daily, (919) 232-2075.

Core Sound Waterfowl Museum—Open year round, Mon.-Sat. 10-5, Sun. 2-5, (919) 728-1500.

Elmer Salter, Redhead, Carteret

courtesy of Kroghie Andresen

Mitchell Fuller, Female Pintail, Carteret

Robert Pigott, Scaup, Carteret

courtesy of Kroghie Andresen

Mitchell Fulcher, Brant, Carteret

Carteret County
"Down East"

Waterfowling in Carteret County was a little different from hunting in other parts of the coast. The blinds varied from unbushed stake blinds situated a mile from shore to sand pits along the ocean beach. Decoys show the same diversity. Carteret County hunters made shorebird decoys—egrets, herons and cormorants. These unusual decoys were often crude but functional.

Carteret County decoys were styled after decoys to the north. Many sportsmen from the upper Chesapeake Bay and other northeastern regions hunted here, often bringing their own decoys made by Chesapeake carvers. Many factory-made decoys also found their way into rigs used by local guides. The Carteret County style of decoy could be described as an assimilation of these "imported" decoys.

The art and history of decoy making in Carteret County could be described as a pyramid with Mitchell Fulcher of Stacy at the pinnacle. He internalized the Chesapeake style and produced a decoy similar to those made by "Daddy" Holly of Havre de Grace, Md. Many Holly decoys have been found in Carteret County, some even bearing an "M.F." carved in the bottom. Fulcher was a prolific carver from 1895 to the mid 1930s. All of his decoys were wooden or cork, and most are marked with his initials.

Eldon and Roy Willis of Stacy carved many fine decoys, including some unusual bufflehead and teal decoys, in the 1940s and 1950s. Roy remains active in preserving the history of decoy making in Carteret County.

In the 1920s and 1930s, Henry Murphy, Leckler Lewis and Julian Hamilton Sr. carved pintails, redheads, geese and brant for use at their stake blinds behind Portsmouth Island. Julian Hamilton Jr. carries on this waterfowling tradition today.

North Carolina's decoys say a lot about their makers and even more about where they were made and why. Because of that, they are genuine folk art, pointing back to a time when the skies truly were black with ducks, geese and swans and no one figured the good shooting would ever end. ☑

All decoys courtesy of Currituck Wildlife Museum except as noted.

Studio photographs by Melissa McGaw
On-location photographs by Ken Taylor.

Mannie Haywood *of Dare County made this swan and other canvas goose decoys for sportsmen in Currituck and Dare counties. Carteret County carvers used less canvas in their decoys, but more balsa, cork and other local materials.*

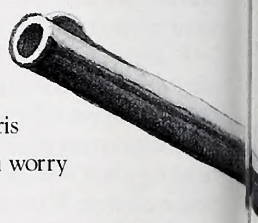
For Pete's Sake

It took me years to recognize it, but Dad's legacy was there all along.

written by Mike Gaddis ©1997
illustrated by Jim Brown ©1997

In a chilled November night, the big house lay still. Still save the pops and crackles of its bones, and the ticking of the mantel clock. The fire lay gasping in desperate flickers from dying coals, and in the ebb and flow of its feeble light I sat studying the man I had known since my first breath. He was painfully different now, more mortal...the toll of the years clearly etched into his brow, into the corners of his mouth and eyes, and in the droopy, yellowing edges of his mustache...compelling yet, but suddenly vulnerable. It hardly seemed possible. Somehow the years between us had dwindled.

I was his only child. I climbed trees, whittled sticks, wrestled and fought with the boys. It was partly circumstantial. Partly it was me. I craved adventure, and there wasn't much of that around the kitchen. Mama worried herself sick over the prospects that I would grow up wild and unruly.



"For Pete's sake, Henry," she'd say, "that girl's been off with the Harris boys again. Lord knows where! Folks will think we don't care. Don't you worry about her reputation?"

Papa knew I had the wanderlust in me. Came naturally. He was a will-o'-the-wisp, forever off on some odyssey most folks thought strange. He refused to engage the question openly, and to lighten the tension and tease Mama, he started calling me "Pete." He had been more than my father. He had been my friend.

Papa was a hunter. He shared it with me, all the trappings and traditions. I came to love it almost as much as he.

By the time I was 12, I was well blooded. I could carry a fairly decent bird hunt to completion, judge where a rabbit would side-slip the beagles, and talk the spurs off a careless gobbler. Papa and I would haunt the oak and hickory ridges on still, sunny mornings prospecting for squirrels. He'd walk and I'd watch for a tick of movement or a bump that looked suspicious. Then I'd walk and he'd look. I shivered alongside him in pit blinds on the Pamlico and on stilts over Currituck. We were a team.

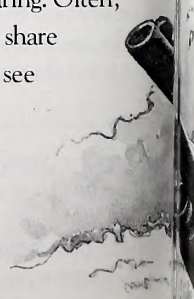
I tried hard to make sure Papa was never sorry I wasn't a boy. Some nights I would fall into bed and sob into the pillow with the sheer exertion of it. In spite of it all, there were times I fell short. The intense reckoning of those occasions was inescapable, and I would think, "If I had been a boy, I could have done that." He took what I thought were my shortcomings well. Still, there was an allowance of sorts, a certain, unspoken tolerance between us that forestalled the equanimity I had longed for all my life.

At 14, I had gained more of the independence I had yearned for. Other girls my age were into home crafts; I was still in the woods wandering for excitement. Papa had turned the kennels over to me, and on opening day of the hunting season that year, he gave me a shotgun.

"For keeping the dogs in fettle," he said.

It was a Specialty-grade Smith, an exquisite little 20-gauge, and it came up just right because Papa had the stock dimensions built to mine. I may not have looked any different on the outside that day, but I changed a lot on the inside.

He began hunting with me in earnest then. It was wonderful, and I felt the closest to him I ever had. It was so exciting! One afternoon we'd hunt quail, jacksnipe or turkey, the next, rabbits, squirrels or ducks. But it was more than just the hunting. It was the sharing. Often, we'd pull up and simply sit by a creek or under a tree on top of a hill, and he'd share thoughts of life and living, of striving and struggling. Of what he wanted me to see and feel in the world, the things he didn't want me to miss.



Even so, there remained places I couldn't go. As unpredictably and spontaneously as a summer thunderstorm, he would simply disappear for a week, and return as matter-of-factly as Sunday religion. Sometimes, like the falling barometer, I could sense its coming and would beg to go. Now that

we were practically inseparable, I was sure he would finally take me. But he wouldn't. A day or two would lapse, then first light of the following morning his chair at the breakfast table would be empty and the vacancies in the kennel would complete the story.

In a few days more, we'd get a card from the Dakotas or the Mississippi Delta, or some other foreign location. Mama would read it to me, and I would strain for his promise of return.

It was a little thing I guess. I really should have been satisfied. But when you're young and tender and really, really love someone, distance of any kind is an untenable anomaly.

Papa and I remained forever close, but there was always that final, small measure of insecurity. I wondered again, often, would it be different were I a boy.

Meanwhile, the miles and years turned by...so very quickly. One day I left for school, and suddenly, I had my own life. After college, I landed a job as an art buyer for a San Francisco gallery. Soon I was traveling to exotic places, doing exotic things. There were Paris and Rome, the Serengeti and the Alps. I met David and, for the first time in my life, fell in love with someone other than Papa. Mama no longer had to worry about what I had done as a girl.

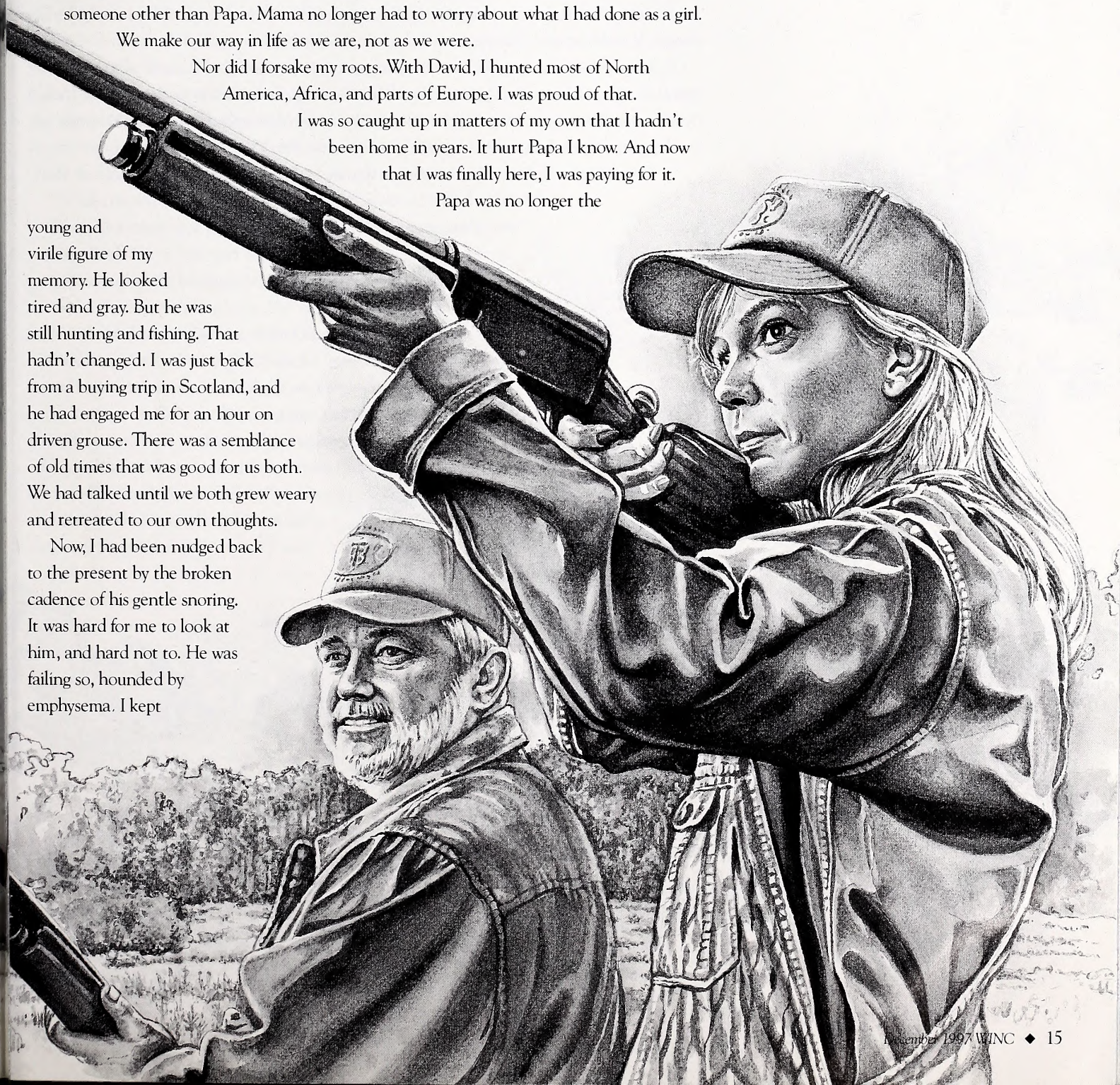
We make our way in life as we are, not as we were.

Nor did I forsake my roots. With David, I hunted most of North America, Africa, and parts of Europe. I was proud of that.

I was so caught up in matters of my own that I hadn't been home in years. It hurt Papa I know. And now that I was finally here, I was paying for it.

Papa was no longer the young and virile figure of my memory. He looked tired and gray. But he was still hunting and fishing. That hadn't changed. I was just back from a buying trip in Scotland, and he had engaged me for an hour on driven grouse. There was a semblance of old times that was good for us both. We had talked until we both grew weary and retreated to our own thoughts.

Now, I had been nudged back to the present by the broken cadence of his gentle snoring. It was hard for me to look at him, and hard not to. He was failing so, hounded by emphysema. I kept



studying his face, trying to picture him as a young man again, the one I had worshipped as a child. How far we both had come. How would I manage when he was gone?

He seemed to sense my gaze and stirred slightly in his chair. "Awake, Papa?" I asked softly.

"Uummhm. Gone awhile, huh?" he returned groggily.

He slowly pulled himself to his feet and punched the fire to life. The shadows danced on the walls.

"We'd better be off to bed, Pete. It's early up come day."

"Think I'll sit a bit longer, Papa. I don't think I could sleep."

His hand brushed my shoulder as he passed. There was a soft swish as he left the room, and the sweet stench of old man and tobacco smoke.

"'Night, Papa," I whispered. I was glad he could not see the tears.

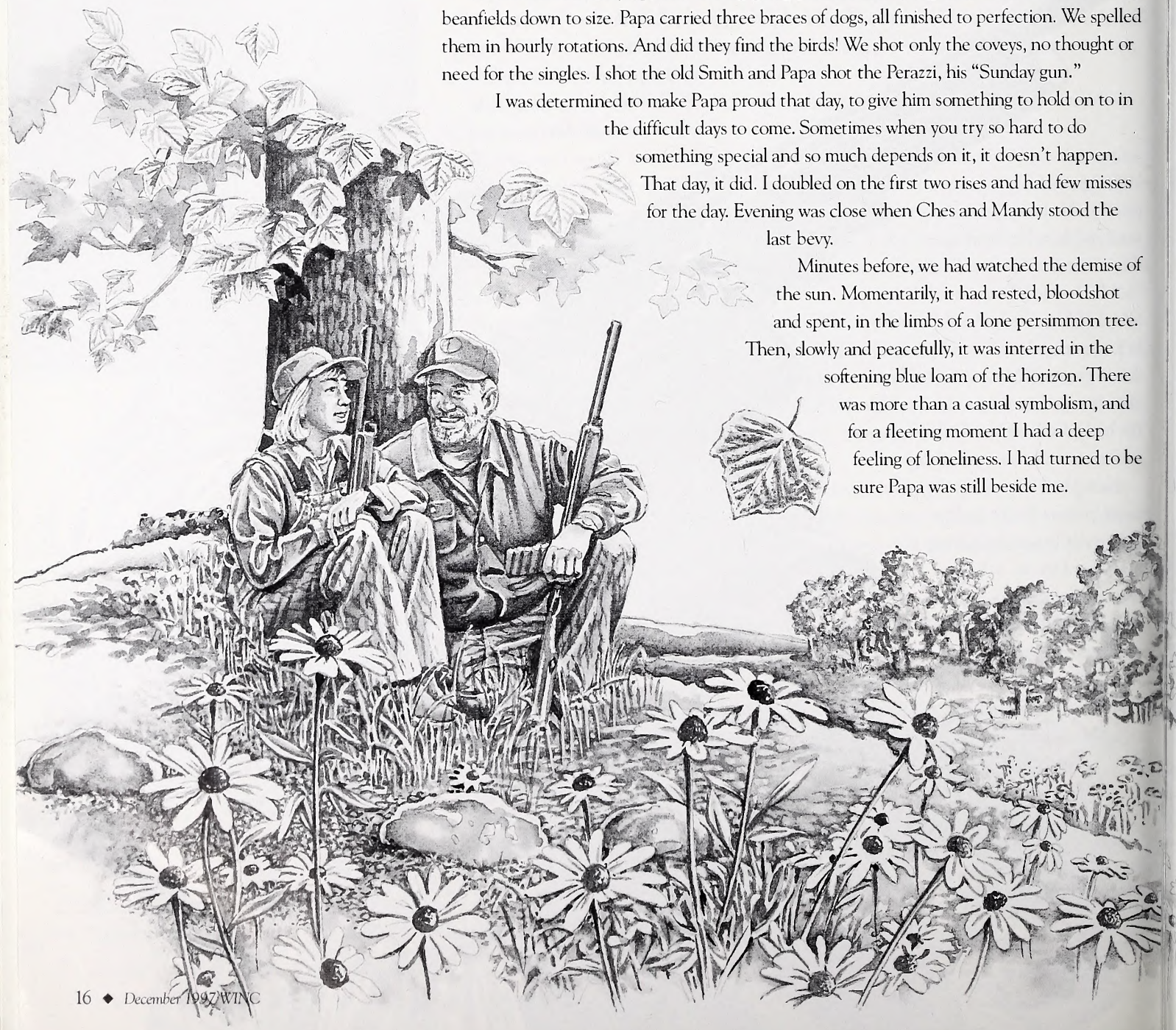
I glanced at the hands of the mantel clock once more. It was already Thanksgiving Day. I thought about that for a long while.

We returned thanks that year on a quail hunt over the Stidwell farm, where it had all started. It had been the first place he had taken me as a girl.

We hunted from the jeep, with the big-going pointers down, dogs that could whittle the long beanfields down to size. Papa carried three braces of dogs, all finished to perfection. We spelled them in hourly rotations. And did they find the birds! We shot only the coveys, no thought or need for the singles. I shot the old Smith and Papa shot the Perazzi, his "Sunday gun."

I was determined to make Papa proud that day, to give him something to hold on to in the difficult days to come. Sometimes when you try so hard to do something special and so much depends on it, it doesn't happen. That day, it did. I doubled on the first two rises and had few misses for the day. Evening was close when Ches and Mandy stood the last bevy.

Minutes before, we had watched the demise of the sun. Momentarily, it had rested, bloodshot and spent, in the limbs of a lone persimmon tree. Then, slowly and peacefully, it was interred in the softening blue loam of the horizon. There was more than a casual symbolism, and for a fleeting moment I had a deep feeling of loneliness. I had turned to be sure Papa was still beside me.



We walked to the dogs in the gathering dusk, Papa and me, wanting to freeze the moment in time. Then the birds were up and away. I swung past a fast, crossing Bob, watching him fold crisply at the shot, then recovered in time to stop another as it topped the tree line. I took a single step to regain my balance, and a lay bird bounced up from my feet so closely I could feel the rush of air from its wings. And I was spinning as I thumbed in a shell, and then the gun was up somehow, and the bird dropped in a shower of feathers before it could reach the woods.

A few seconds passed before I realized Papa had not shot. He had not intended to. He stood watching me, beaming.

"By God, Pete, I must have done something right," he exclaimed, ruddy with excitement. "That was damn fine shooting."

For those few seconds, all was right in the world. In the arena of his choosing, I had proven myself an equal. In the span of a fleeting minute, the years and distance between us had closed.

I left again the next day. But not all of me. There was an untoward holdover in Dallas, and the flight back to the West Coast was extended. It mattered little; my mind was still in Duplin County.

We had sat on a hill, Papa and me, on a day late in September many years before, a mossy knoll that spilled into a laughing meadow. The meadow was gaily painted with black-eyed Susans, and a small creek chortled happily along its belly, the highlights on the water dancing like refracted light in cut crystal. Among the thick, green ferns were leaves of gold from the sycamores, and there were mare's tails in the forever blue sky.

At the end of a long silence, Papa had turned to look deeply at me.

"What is it, Papa?" I had asked.

"Pete, you know that little liver pointer, Breeze, you like so much?"

"Yes, Papa."

"What makes her so special."

"I just like to watch her, Papa. She always runs happy, and she's the first to birdy places. She finds more birds than the other dogs. She's just exciting!"

"You've got a good eye, girl," Papa had teased.

He had turned to me and caught my hand. "Breeze is special, Pete," he said, "because she puts her absolute all into everything she does. You can breed dogs for generations, good dogs, and maybe one in a hundred puppies turns out that way."

"Pursue life with a passion, Pete, " Papa had said. "Put everything you have into it. Never settle for less from yourself. There's so much to see and feel. One lifetime won't be enough."

All my life I have taken that to heart. It was his greatest lesson, and it would be his greatest legacy.

Lulled by the drumming of the plane, I looked out the cabin window to the earth far below. It crept by at a deceptive pace in great multicolored patches and rectangles, tearing me mile by mile far away from him again. I could imagine him hurting now as I had hurt on the occasions he had left me as a girl, to pursue his own passions. Yet, it was what he willed me to do. What was inexplicable then was understandable now.

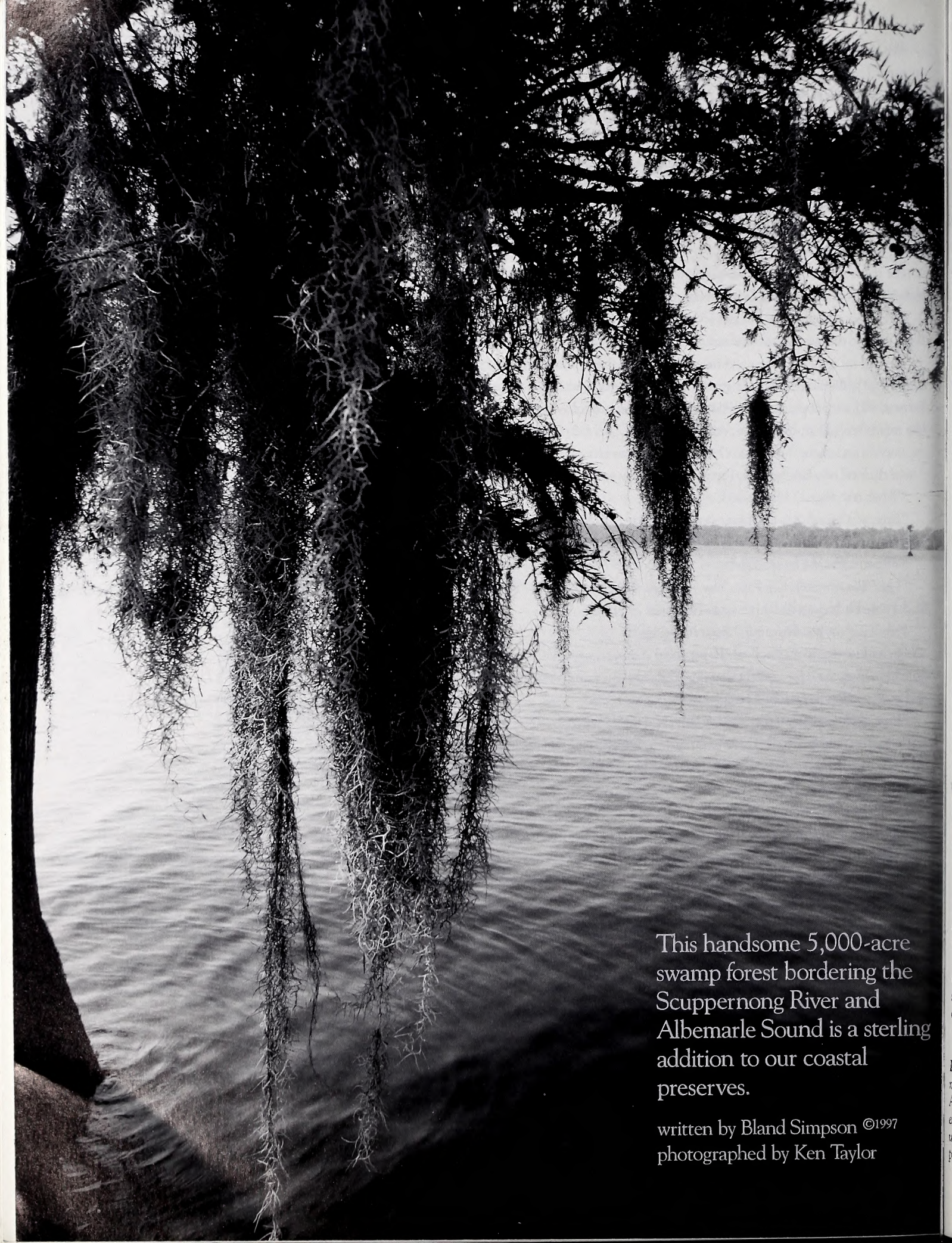
"I must get back *soon*," I admonished myself. Almost immediately, I wondered if I would.

So very often, human aspirations have lonely destinations. Yet, it was in me. There was much left to finish, seasons to go. And I was a grown woman long since, and no longer the girl. When it all ended, would there be someone who cared, someone like myself with Papa, who would ultimately understand that there were simply places I, alone, had to go. I hoped so.

The blare of the cabin speaker broke my reverie, announcing the impending arrival. I fastened my seat belt and began to mentally make ready for the landing.

Settling against the back of the seat, contemplating my itinerary, I smiled inwardly. I was my father's daughter, even more than I had known. ⊠

We walked to the dogs in the gathering dusk, Papa and me, wanting to freeze the moment in time.



This handsome 5,000-acre swamp forest bordering the Scuppernong River and Albemarle Sound is a sterling addition to our coastal preserves.

written by Bland Simpson ©1997
photographed by Ken Taylor

The BULL NECK of HEART'S DELIGHT

One overcast spring Saturday, the first of March just past, I rambled down to Tyrrell and Washington counties for a closer look at the low, low lands my West Scot kinsman Godfrey Spruill came into exactly 300 years ago. Doctor Spruill, a surgeon in his forties, and his wife, Joanna, were settling a patch of ground on the west bank of the Scuppernong River at its mouth into Bull Bay, and I wanted to boat upon the broad waters of that bay and see something of what they saw when they floated across the Albemarle Sound and entered the section now known as Colonial Beach but then in the 1690s called simply Heart's Delight.

No small jaunty cottages were there to beckon them, no radio towers to sight on and sail toward, but of this I am certain: for 4 miles along the Albemarle and for nearly 3 miles along the western shore of Bull Bay, there was then, as there is now, an enormous swamp forest. With the state's late-1995 purchase of this stout swamp, the great wilderness joins the growing chain of public land and habitat that between Albemarle and Pamlico sounds includes Alligator River, Lake Mattamuskeet, Pocosin Lakes and Swanquarter National Wildlife refuges, and now more than 5,000 acres of northeastern-most Washington County named:

Bull Neck Swamp.

In Columbia, from librarian Doug Hoffman, my old friend David Perry and I borrowed a 16-foot fishing boat and set out for Bull Neck. The night before, Perry—a trout fisherman and ever-ready editor—and I had feasted at the Sunny Side Oyster Bar in Williamston on the Roanoke River, and, so stoked, now in the center-console *Hoffman* we were plying the Scuppernong from a west-bank landing just downriver of Columbia, the county seat where my grandmother Evelyn Spruill nearly 90 years ago had met my grandfather J.A. Page in jail—when he was the man in charge of building it and she was a curious local citizen there on a brother's arm, just checking out the security of its design.

We made for the sound, straight out Bull Bay, and during the half hour it took to reach the Albemarle at Laurel Point, the Saturday morning sun worked steadily at breaking through the clouds and burning off a heavy mist. When at last the big light hit the swamp woods just south of the point and illuminated them, the whole length of shoreline suddenly saturated in spring-maple pink, it was bright and right breath-taking. The far coast of the sound we still saw through the mists, though closer; just a ways northeast of Laurel Point sat several dozen gulls on pilings on a ruined silver-and-rust frame out in the water. At the twisted angle iron, Perry and I came about and started working our way down Bull Neck's shore from the point, the *Hoffman's* depth finder telling us we were cruising in only 3 feet of water 50 yards out.

The woods here were a mix of maple, cypress, pine and myrtle and, as at most eroding shores, held out no shortage of dead trees akimbo, and with their bark sloughed off. An occasional crabpot bobbed in water that was easy, almost slack, and now the sunlight in regular waves fell over the forest and sparkled on Bull Bay. We got off the shoal that stretched out from the point, and then, when we were showing 9 feet 40 yards out, Perry and I turned and went on in, beaching the *Hoffman* amidst the stumps and water-logged root-tangles, the wooden boneyard of Bull Bay's sandy beach.

We ambled up and over the narrow bay-beach's primary—and only—dune, a rise of perhaps a couple feet that then rolled off, down and away immediately into the muddy

***Large cypress shrouded** in Spanish moss line the shore along Bull Bay and Albemarle Sound on the northern and eastern edges of Bull Neck Swamp. The woods also contain plenty of myrtle, pine and maple.*

Bull Neck's Legacy

Bull Neck Swamp was purchased in late 1995 by the N.C. Department of Agriculture, which then granted a long-term lease on the property to N.C. State University's School of Forest Resources. The holding is about 5,400 acres in size and is cited by project director Doug Frederick of NCSU as being "unique, an excellent research tract," because the hydrology of Bull Neck's swamp forest is almost exactly what it was at the time of European settlement—it is a rarity, an enormous piece of undrained and unfilled coastal land.

There are already plans afoot to enlarge the Bull Neck property. In the spring of 1998, Frederick will seek N.C. Natural Heritage Trust support to purchase an additional 743 acres northwest of the tract and to acquire a 65-acre inholding in the tract's southeastern portion. Several other nearby portions would make logical additions, according to Frederick: a Department of Transportation quarry just below the Deep Creek boat landing; a 400-acre section of swamp east of the DOT quarry; and 2,000 acres of what he calls "fantastic swamp land" south of Pea Ridge Road, an area of big sand ridges separated by deep cypress and mixed hardwood swamp.

Daytime access to the interior of Bull Neck Swamp is easily gained by hiking across the bridge at Deep Creek landing. If one is boating down Deep Creek and along Bull Neck's perimeter and searching for a spot to beach, wear boots and mind the stumpy shoals. For more information, write: Dr. Doug Frederick/Bull Neck Swamp, School of Forest Resources, Box 8008, N.C. State University, Raleigh, N.C. 27695-8008

bottom of Bull Neck Swamp. In knee-high rubber boots we walked about for a spell in the swamp, a cutover woods regenerated now much by maple just like its larger, near-northern neighbor, the Great Dismal. The air is frequently still and close in such a place, and after a bit Carolina-mountain-born David Perry smiled and shook his head before we headed back through the sucking muck for the beach, passing judgment:

"It's quite . . . claustrophobic in there."

Someone or something, a winter's wave maybe, had set a 12-foot plank neatly across the fallen trees like a bench, and I sat there upon it for awhile just enjoying this bright day that the first of March had become, the blue sky above bay and sound and another Carolina spring coming on. An old thin-slat bushel basket lay there on the beach, and I had heard four or five loud woodpecker chops when we first landed. Something is always wearing away at wood, I thought, weathering it, taking it to task somehow. A woodpecker-gnawed tree hung at a 10-degree tilt out in the water, and the little bay waves splashed over the root-tangles and hit the hollows of waterlogged trees, making deep, questioning sounds like bullfrogs do.

What would become of Bull Neck? All the tree stumps in the shallows undoubtedly marked where dry land had been till wind and waves and the sea's rise over time reshaped the shore, moving it back several hundred feet since European settlement. The sandy strand itself was no more than 20 feet wide, and the big bottom beyond could not have been 2 feet above the level of the bay—if that. For now the thin lens of sand seemed just enough of a topo-presence to protect the vast swamp muckily consolidated behind it, though rising water levels and the ferocity of erosive nor'easters could move Bull Bay, and Albemarle Sound, right in on Bull Neck Swamp someday.

But not this day. Perry and I spun the *Hoffman* around and plied for deeper water, seeing spires of juniper and tall pines now in the waterside woods, clearer beach and more cypress too as we chugged back up the bay. A small craft advisory for this particular marine territory: an enormous shoal broadens out from the more northerly of two prominent points here on the west side of Bull Bay, and takes up much of the underwater real estate down to the lower point, near which daymarks signal one away from the shallows and into the mouth of Deep Creek.

Here in the quarter-mile cove leading into the dark and narrow creek were some of the loveliest of Bull Neck's natural features, several small islands—some marsh, some wooded—and an incredibly mossy cypress forest all along the water's edge. Ospreys circled above us, and we wandered up a branch, spooking a few sunning turtles off their logs and marveling at the hanks and cascades of Spanish moss—all the bed stuffing in the world seemed to be hanging in the trees at Deep Creek's mouth.

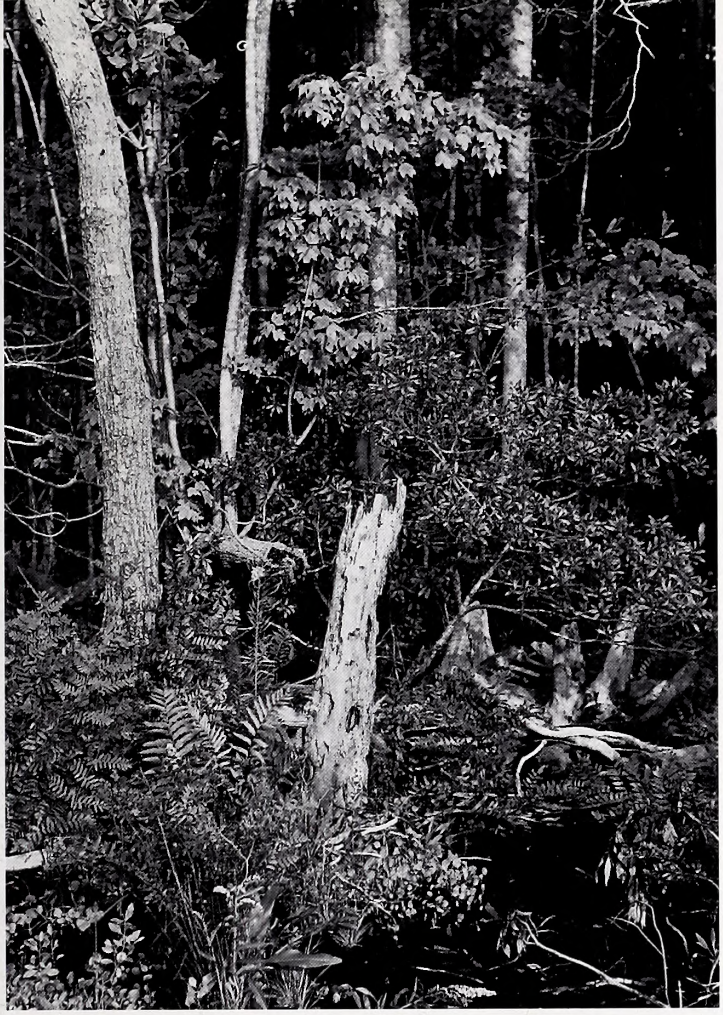
Not far up the creek itself, on the north bank, lay the frame of an old landing where barges that bore the big cypress and juniper woods away once lay up and loaded, for the forest fell here in 1917 and '18, again in the 1940s, yet again in the 1980s. These stout timbers ran perpendicular to the creek bank for 40 yards or so, with a few still lying across them in a grid. A slider sunned here too, and some of the old supports now served the forest in a different way: young 3- and 4-foot pines had rooted in the waterside timbers and were growing up out of them. To the north, I knew, over a thousand acres had sprung forth again in juniper, and, at least in part, the new woods would more and more resemble the old.

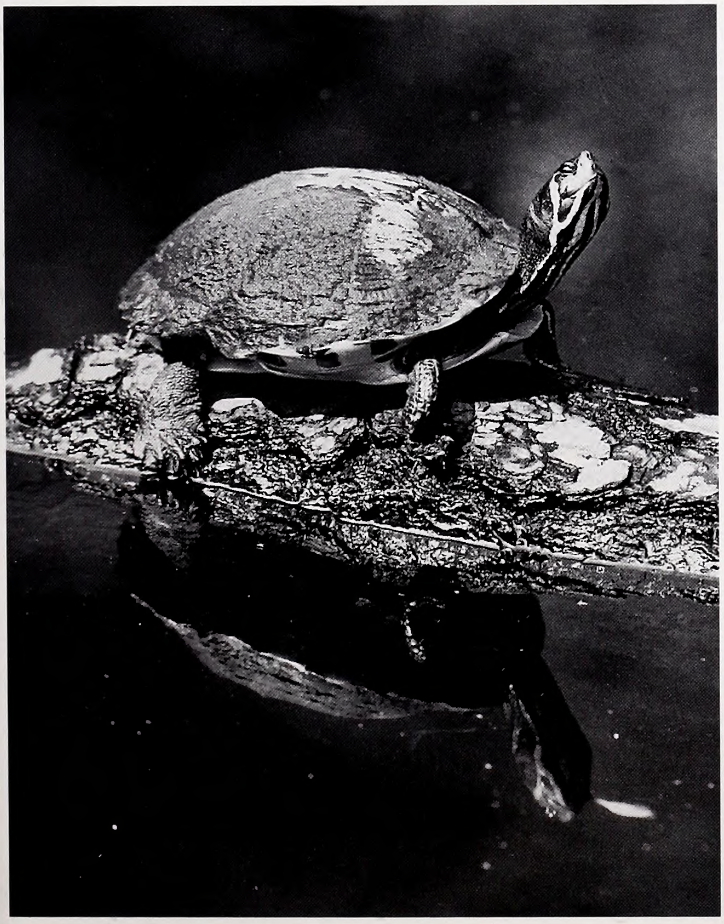
It was a good cruise, a gliding view of the bayside and creek bordering the state's new holding. On the way back upriver, Perry spotted a bald eagle in the treetops of Scuppernong River's eastern shore, perhaps one of the pair recently found nesting in a tall dead pine near Bull Neck's center. At our landing, a friendly, open-faced fellow with big ears and a ball cap was fixing to launch his sparkling blue bass boat, and, after saying he was just getting the boat out to go for the first ride of the season, he asked us with a broad springtime grin:

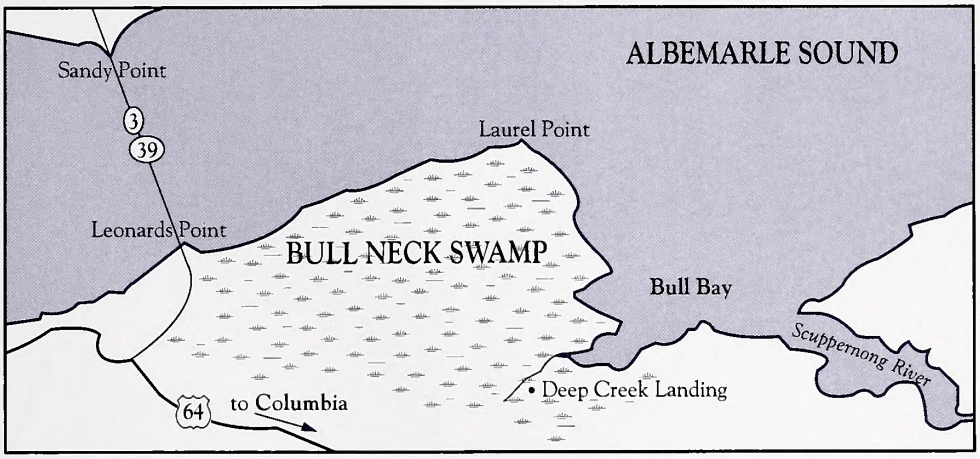
"Didn't catch 'em all, did you?"

Then it was early September, and I went back on a day that had dawned rainy and miserably misted up in the Piedmont, but that mystically started to clear about the time I stopped at Shaw's BBQ in Williamston for two sandwiches—with slaw—to go. A new saying, perhaps: Eat well in Martin County, and there'll be a fairing off to the east. Whatever caused it, that Wednesday became a glorious Coastal Plain Indian summer day, with farmers cutting corn everywhere and cotton and crepe myrtle and goldenrod all in flower. I drove for the Y east of Roper, toward the sound bridge, then east on Pea Ridge Road, its ditches all full of water, to the purple-and-white painted tractor tire that marked the turn onto Spruill Road. One trail into Bull

***A nearly impenetrable** swamp forest greets visitors to Bull Neck Swamp (top left) where sliders (bottom left) bask along the shore and in canals or flooded areas, and myriad species of butterflies like this Buckeye,* Junonia coenia, *(top right) are seen flitting about. A hazy sun dips behind the gaunt forest at Laurel Point (below right).*







Along the shore, *waves wash against a narrow, sandy shore where stands of cane sway amidst ancient stumps and tangled downfalls (upper far left). The dark, placid waters of Deep Creek flow through the southern edge of the swamp (upper near left), and near Deep Creek Landing, the decaying hulk of a long-abandoned derelict lies in dense brush against the creek's south shore (below left). Countless wildflowers like this goldenrod (above) create bright seasonal patches of color virtually everywhere.*

Neck lay at the end of Spruill Road; it was fairly passable, but too high with weeds for good snake-spotting, so I elected to walk in from the lane's southern end.

Deep Ceerk, read the green rectangle a few miles away, and, seeing yet again the transliterative humor of those who make and habitually misspell our road signs, I knew I was at the exactly the right place. Deep Creek Landing Road, just motor-graded, was mushy, with pooled water relaxing upon it in places. Cattails stood along the road in loose ranks, at ease amongst the deep blue wildflowers and the tall yellow ones. Yellow moths flitted about everywhere, and cicadas filled the eastern air with their oscillating trills.

This time at Bull Neck I was alone, and on foot.

I left the jeep on the south side of Deep Creek, at the sandy landing beside the wooden plank bridge, glancing at the minnows in the shallows and the airy blue dragonflies hovering above them, then strode across the bridge and on up into the neck. To my left lay several sliders, dry and matte black, on a pine fallen into the canal (the only such cut in the great woods, and well west of its bayshore) dredged to make the neck's causeway road.

Or road*bed*. There ahead of me were the splintered crossties of an old logging railway, and what caught my eye was a round and rusted metal spike top, obtruding from the wood buried in the sand road and shining in the September sun like a gigantic copper penny. The wet woods to either side grew sweet gum and maple, and lavender flowers put spots of color against all this green. Now and again a frog jumped, landing heavily in the water of the canal, and that was noise and adventure enough for this pilgrim.

Only a half mile in a canebrake began in earnest, filling the road shoulders and narrowing my field of vision. In a light southerly breeze the cane—some of it 8 feet high—heeled over easily and whispered *shush* with the wind like Capote's grass harp. And this song brought forth my snake. He, or she, sat right in the middle of the road, and never made a move as I walked up to it, kneeled and held it, let it run through my fingers and fall from my hand as a child would let go of jacks. It was a viper *incognita*, for bleached bones in a little white pile were all the swamp had left of it.

I moved on out of the canebrake, staring up at gum tree mistletoe, at a pair of big Navy choppers that rattled the air and shook Bull Neck, staring too at the hypnotic vanishing point that drew me forward as so many others like it had before—wet woods at Big Flatty Creek, Cedar Island, the Great Dismal Swamp. Something was there, just a few feet ahead, a quarter mile, mile at the most, but it would only reveal itself if one kept walking, watching, waiting. The skeleton of a snake, the skeleton of a railroad, the neck of a bull, and whose bull was it got loose and wandered these wildwoods and for how long, bellowing long and loud enough for someone named Spruill (or someone known to or kin to a people of that name) so to christen the big swamp and the bay beside it?

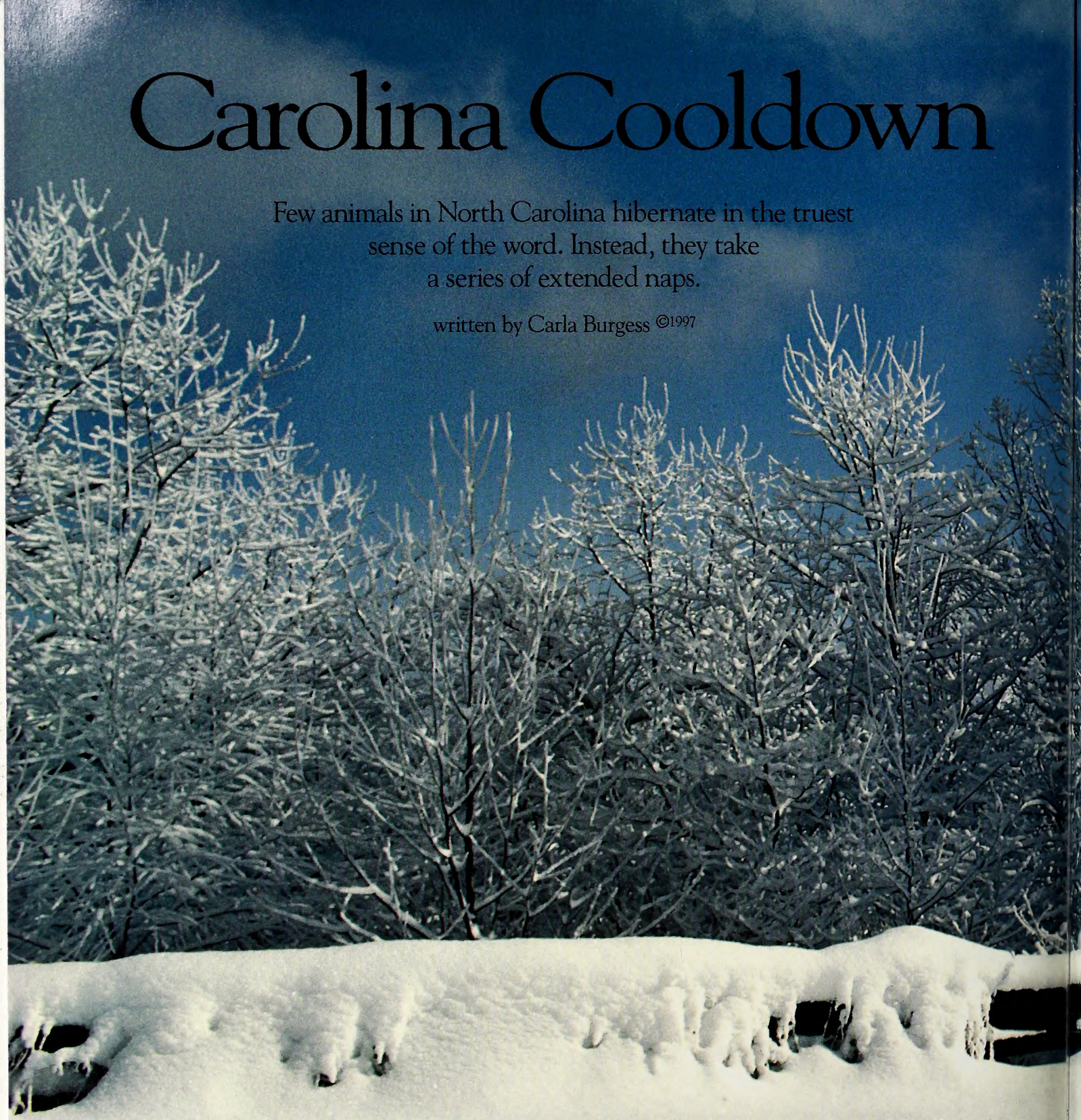
An unseen duck flushed, and wings booming in flight up a canal in such a forest will wake a body from such a dream. I was more than a mile from Deep Creek Landing, alone in bear country, let alone bulls, and with no difficulty I recalled the tale of my cousin Thomas Yerby, who a generation ago was sheriff of Tyrrell County and who once, returning from a deer hunt hereabouts, found the swamp lane back to his vehicle blocked by a large black bear that, upon seeing Thomas, then lumbered purposefully toward him. Thomas came out all right, though—he had a shotgun and buckshot, and he was loaded, as it turned out that day, for bear.

Back down at the landing I stopped on the rude bridge and regarded a 20-some-foot derelict on the creek's south side, a cabined craft lying where it had been retired and left to sink and die. The brush and vines were too thick to get right up to the boat without a blade, but something else was shunted up in there too, and had been for far longer than any humans of any name were ever even in this realm fishing, hunting, fashioning boat hulls or knocking big trees down.

A vine of muscadine, the deep purple grape of which the hearty scuppernong is a sport, was heavy laden with ripe fruit; so on my way out of Bull Neck Swamp, to the Old Country I tipped my hat, and then filled it. ⊠

Into the Sound Country: A Carolinian's Coastal Plain, *by Bland Simpson, with photography by Ann Cary Simpson, has just been published in paperback ($19.95) and hardcover ($34.95) by the University of North Carolina Press, P.O. Box 2288, Chapel Hill, N.C. 27515-2288.*

Carolina Cooldown



Few animals in North Carolina hibernate in the truest sense of the word. Instead, they take a series of extended naps.

written by Carla Burgess ©1997

A funny thing happens to me this time of year. I start craving soup three meals a day. I luxuriate in fleece. And my idea of a nice night out is to dress in layers, trek to the middle of a frost-crunchy hay field, stretch out under a clear sky and stare at the stars.

I imagine the venomous snakes and bloodthirsty insects that keep me from this pastime in summer are galaxies away. I think of all the plumped-up, four-legged creatures with faces buried in their thick fur, hiding from this relatively brief blast of cold that's winter in the South. Lying there alone, bundled against the elements, I am queen of the Tar Heel "tundra."

But one night, I'm rudely awakened from this illusion by the loud snort of a deer from the pitch black beside me. A snort as if to say: "Get up, silly human, and go back inside. Wild animals have survived the cold for millennia. And we've done it without any help from Gore-Tex."

It was a wake-up indeed. How many times had I walked through the winter woods and taken the quiet for granted? I'd imagined the voices of summer were "away" somewhere. And I had little idea what lay dormant in the cloak of leaves and other sleeves of fallow forest.

When Nature is in *deep freeze, some North Carolina wildlife species respond by slowing down or taking cat naps. Few are classic hibernators that take long, deep sleeps until spring wakes them up.*

KEN TAYLOR

Fortunately, some people have given a lot of thought to how nonmigratory creatures cope with cold.

Back in September, research scientist Matt Andrews turned out the lights in his N.C. State University laboratory earlier and earlier each night. These days, his 13-lined ground squirrels, chipmunklike animals he imports from Illinois, are coiled in hibernation inside dark refrigerators. Usually the ground squirrels' body temperatures hover around 90 F. But now, each animal has lowered its core temperature to about the same as the fridge's thermostat—38 F to 40 F—for this simulated Midwest winter. Each curled-up critter—the size and texture of a cold tennis ball—barely breathes; its heartbeat is infinitesimal.

A compact package, 13-lined ground squirrels make perfect study subjects for Andrews, who wants to unlock the genetic secrets of hibernators. Though the critters aren't found naturally in North Carolina, their physiological responses to winter model many that are. Groundhogs, also known as woodchucks or marmots, many bats and the jumping mouse—all common state residents—hibernate to get through the toughest parts of winter. When the days shorten and food becomes scarce, these animals would

have to burn more energy looking for fuel than the fuel would be worth. So they find shelter, cool their engines and wait for the cost of living outside to go down again. The question of how they do it has long baffled researchers like Andrews.

"What gene product is it that these animals express that enables them to survive conditions that would kill a person?" asks Andrews. While discovering answers to basic biological questions, similar research may one day help sick humans. Some animals' abilities to shut down major organs without dying, to remain inactive for months and not lose bone mass, and to thrive in a hypothermic state have profound relevance to such medical ailments as stroke, heart failure, kidney disease and osteoporosis. More insight into this winter dormancy might also enable prolonged space travel (a zero-gravity environment is hard on the bones). And enlightenment about seasonal rhythms might help people who struggle to work swing shifts.

Hibernation is most likely triggered by declining day length and a dearth of food. What exactly happens to animals under these conditions differs from animal to animal. The mammals already mentioned are hibernators in the classic sense—they undergo drastic decline in breathing, heart rate and metabolism, and their body temperature drops close to that of the surrounding environment. Some biologists like to separate "true" mammalian hibernators from those who experience periods of torpor, but others give the term more latitude.

"You have a whole bunch of animals that respond in different ways to winter," says David Lee, a curator at the state Museum of Natural Sciences in Raleigh. "To use what a varmint does physiologically and compare it to a caterpillar isn't the same thing, but the word hibernation is probably still okay."

That said, we'll allow that bears hibernate, even though their body temperature remains relatively high and their sleep is fairly wakeful. N.C. State zoologist Roger Powell has looked a lot of black bears in the eye when he's entered their winter dens in the mountains. Field researchers like him rarely see a bear before the bear sees them. Bears often rouse to change dens, and females birth and suckle newborns during their winter lethargy. Hibernating skunks are similarly restless, says Powell. But bears do claim some unique deprivations during their retreat. They never answer, well, the call of nature. And unlike even hard-core slumberers such as groundhogs, they don't sip or snack.

"They'll go five or six months without eating, drinking, urinating or defecating. That's a real trick," says Powell, an associate professor of zoology. "To my knowledge, nobody yet knows the metabolic pathways that bears use to do this."

In fact, black bears efficiently process what would otherwise be a deadly buildup of toxins using minimal protein plus a small amount of water gleaned from burning stores of fat. Mimicking this process, medical researchers have tested a special low-protein, decreased-water diet to reduce kidney patients' dependence on dialysis treatments.

Smaller mammals, including skunks, raccoons and opossums, employ strategies similar to the bear's, fattening up at summer's end and living off stored fat during a winter's nap. Like the bear, their body temperatures drop only slightly. Like the groundhog, they'll also break their fast with a few stored snacks. Chipmunks and squirrels, on the other hand, stockpile loads of food in their burrows for months of winter noshing. Some warm-blooded animals, such as the white-tailed deer, put on extra pounds and a thicker coat but remain on the hoof.

"Deer and species like them deal with this whole situation by strategies of vertical migration," says Bob Ferris, a conservationist with the national organization Defenders of Wildlife. "They exploit high-altitude food resources during summer and spring, then go into lowland areas to feed during winter."

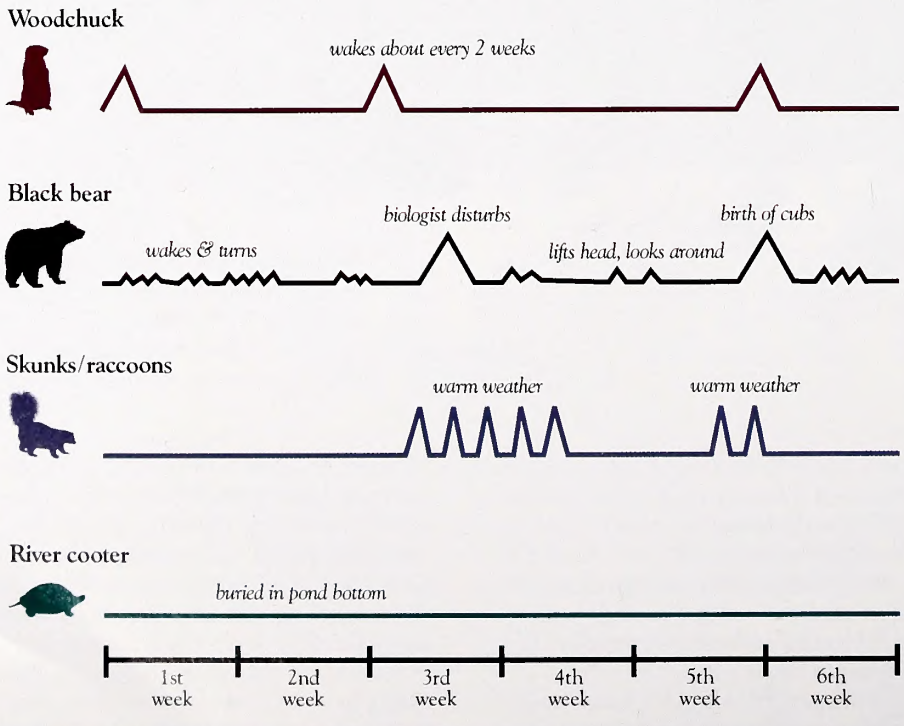
Of course, plenty of animals—most notably migratory birds—just pack up and hit the road, leaving behind what sometimes has the feel of a ghost town. The winter woods sure can seem that way. Resident songbirds are usually stirring here and there; I'm always amazed at how much of a ruckus they make for their size, crinkling papery leaves on the ground and shaking the bushes. I expect to see a fox or rabbit, but instead a bird emerges, its feathers puffed up to create a jacket of insulating air pockets. But beyond these stirrings, the life signs of the winter landscape are deceptive.

The base of a dead tree might be the vestibule of an elaborate hibernation chamber. The spaces where roots have rotted form subterranean hallways for snakes or small rodents. Fissures in rocks provide a stable hideout for some species.

What's clinging beneath the shinglelike exterior of the shagbark hickory tree? It might be a silver-haired bat, says Bob Currie, a biologist with the U.S. Fish and Wildlife Service in Asheville. Other bats that hang around for winter include the endangered Virginia big-eared bat and the common Eastern pipistrelle, which hibernate in caves and mines. Resident little brown bats like cool, moist caves, as do the rare Southeastern big-eared bats, which also choose mines in the Smokies, says Currie.

Activity/Inactivity of Some North Carolina Hibernators

Winter hibernation differs among animals. Over a five-week period, the activity patterns of the following animals might look like the tracing of an electrocardiogram (EKG).



What's that attached to the stem of a tree branch? A shriveled leaf? Maybe. But you could be looking at the pupa of a brilliantly hued butterfly, says Jesse Perry, another curator at the state museum.

"The beautiful tiger swallowtail butterfly that's so common here hibernates and passes through the winter as a chrysalis," says Perry, who guides a local field trip called Tweets and Twigs each January. "In that pupal stage, it just sits out there looking like a round dead leaf."

The caterpillar of the red-spotted purple butterfly may be only an eighth of an inch long. But this butterfly has big designs for its winter home. The caterpillar builds a hibernaculum in the fall by rolling a small leaf into a tube, biting the end off and lining it with silks, he says.

The mourning cloak butterfly bides winter as an adult. It may choose a hollow log or, as an individual did one year, Perry's unheated garage.

"This mourning cloak stayed by a north-facing window all winter and didn't move," he recalls.

Moths spin cocoons in trees. The praying mantis, on the other hand, overwinters in the egg stage. Layers of oblong eggs are encased in a material resembling Styrofoam, says Perry. The casing is attached firmly to twigs or tree bark and protects the eggs from the cold, dehydrating winds.

This brings us to an important distinction: while some critters strive to avoid the cold, some species just give into it with (almost) every fiber of their being. And many—including reptiles and amphibians—are quite successful at coping with winter. So successful, says frog researcher Jon Costanzo, that mammals are inferior by comparison. That's a polite paraphrase.

"They're wimps," quips Costanzo, who regularly freezes frogs in his laboratory at Miami University in Oxford, Ohio. His lab isn't an amphibian torture chamber. It mirrors conditions that several frog species commonly survive in the wild. Some of these—the wood frog, spring peeper, gray tree frog and a chorus frog—have wide geographic distributions that include North Carolina. Costanzo has also witnessed freeze tolerance in the Eastern box turtle and the Eastern garter snake.

"I often get a lot of chuckles because people just don't believe this stuff," he says. Although textbooks say it can't happen, Costanzo has seen his wood frogs survive temperatures as low as -5 degrees Celsius (23 F). They seem to have the most well-developed tolerance, able to stay frozen for up to a month at a time without ill effects, he says. They can recover from having up to 70 percent of their body water as ice!

WILLIAM S. LEA

***Black bears den** during the winter, but they are fitful sleepers unlike classic hibernators. Often they rouse themselves to look for a new shelter.*

"We're not talking about Popsicle stuff, but it's certainly enough (stamina) to survive what one would normally experience in winter," says Costanzo, adjunct assistant professor of zoology. The frogs probably go through several periods of freezing, thawing and refreezing in the wild, he says. Of course, these frogs are exceptional compared to aquatic species such as bullfrogs or green frogs, which burrow in the mud to escape hostile weather.

Though the spectacle of a frozen frog coming "back to life" is intriguing, what Costanzo and his research partner, Richard Lee, are investigating may one day translate to advances in cryopreservation. Organs kept cool for human transplants have a short shelf life; so far, mammalian tissue can't endure ice formation without serious injury.

"That's why we don't yet have an organ-banking system," says Costanzo. Yet the bulk of cryopreservation research has been on mammals. His frogs' internal organs aren't so different from ours, says Costanzo, but they're able to trump us in the deep-freeze category. It's partly attributable to the protective chemical workings of glucose in the frog's bloodstream, he says, and also a function of the dehydrating of cells and vital organs. It has its limits—freezing is tolerated only in the spaces outside cell walls—but it's still a scientific marvel.

Regardless of whose hibernation prowess you admire most, there are plenty of examples around us to observe. The sources I talked to had a lot of stories that, had the messengers not been so reputable, might take on the flavor of tall tales. Frigid frogs notwithstanding, here are a few.

Of course bears climb, but would you expect a 300-pound animal to prefer to sleep on a mattress of sticks in the treetops?

"Bears will sometimes build nests in trees that look somewhat akin to eagles' nests," says Powell. They also might choose a hollow tree, a brush pile, or a cave only slightly bigger than their bodies. "And then finally, some will just curl up on the ground and let the snow fall on them."

The museum's Lee has even more frosty revelations.

"We have some friends who found a shrew they thought was dead," he says. "They put it in their freezer, and the shrew lived in the freezer all winter long, eating the carcass of a duck or something else they'd put in. They were saving specimens for the museum, and that's how we heard about it."

On a more first-person level, Lee's spent a lifetime exploring the outdoors and is partial to turtles and snakes.

"As a kid I used to go out to these rattlesnake dens, take a car jack and jack these big rocks up," he says. "There'd be these piles of rattlesnakes under the rocks, and you could play with them like they were old inner tubes." (Don't try that at home.)

For snakes, hibernation is as much a function of lack of food as their inability to digest it because they're too cold. "The animal itself may be totally awake, but physiologically it cannot make itself do anything because its body temperature is so low," says Lee.

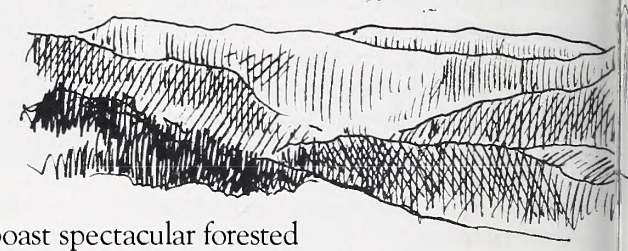
How long will it last—this season of sluggishness? In North Carolina, where people might sport shirtsleeves in January and dodge snowflakes in April, hibernation cycles are as unpredictable as our winter weather and as varied as our land elevations. According to my experts, you're likely to see a groundhog ambling around somewhere in North Carolina on any given day of winter, not just on the fabled February 2 emergence. On a sunny winter afternoon, you might spy snakes and turtles soaking up some rays. And a swarm of gnats near a cave entrance might entice a big brown bat to come out for a bite. By late April in the mountains, black bears are shrugging off their torpor, and by May, they're eating. Other animals are looking for food as well, although quite a few are more interested in mating.

But for now, they snooze, perhaps dreaming of green grass and summertime. And me? I'm treading the winter landscape with a new respect for what's out of sight, but no longer out of mind. ☒

Grab your sketchbook and

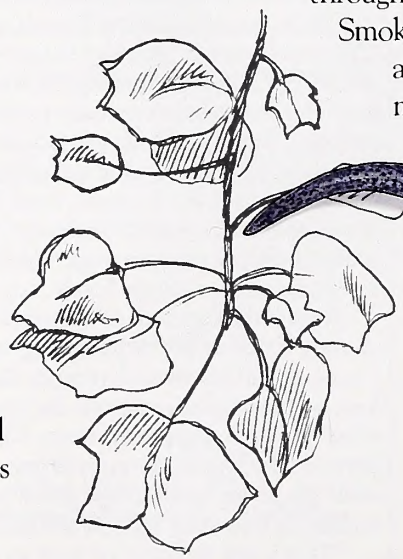
Visit the Rain Forest!

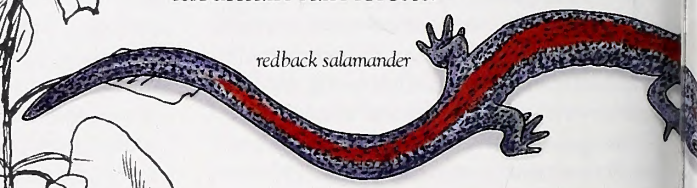
If you think that rain forests are thousands of miles away and you'll never get the chance to see one, think again! In North Carolina there's a rain forest practically in your own back yard.



Written by Carlton Burke
Illustrated by Consie Powell

North Carolina's mountains boast spectacular forested slopes, cascading waterfalls, breathtaking vistas and some of the most varied plant and animal life in North America. And tucked within those high forests stretching from Mount Mitchell through the Pisgah Forest to the Smokies lie lush areas that are actually North Carolina's own mountain rain forests.

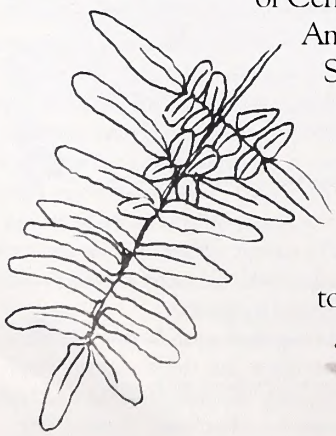




redback salamander

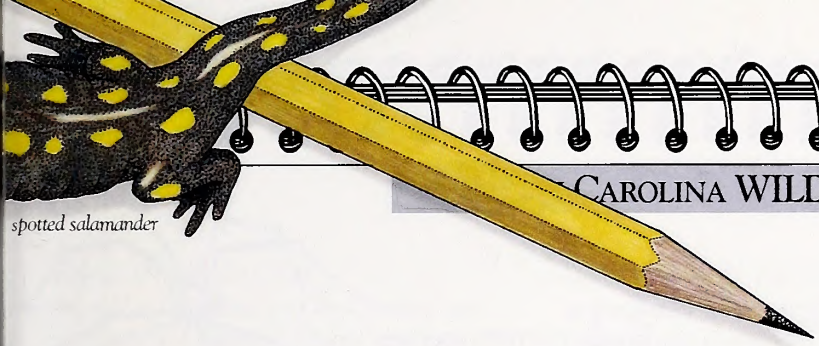
WHAT IS A RAIN FOREST?

Most people think of a rain forest as a hot, steamy place tangled with towering trees and dense vegetation. Such **tropical rain forests** occur in warm, rainy areas of Central and South America, Africa, Southeast Asia and Australia near the equator. They have year-round warm temperatures, high humidity, large amounts of rainfall, profuse plant growth and abundant animal life.



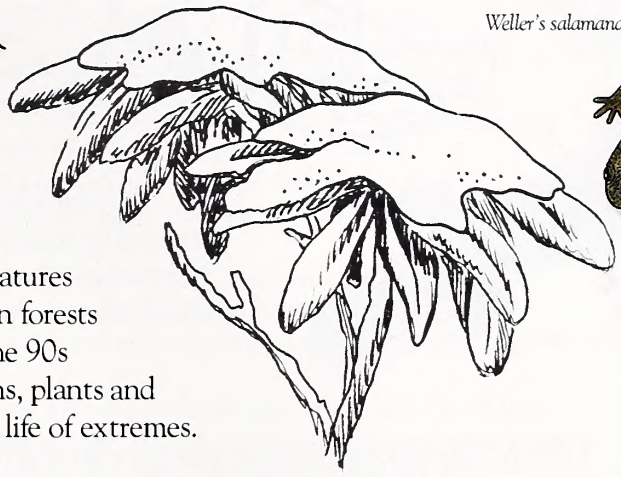
Temperate rain forests occur farther away from the equator where temperatures vary from warm in summer to cold in winter. Unlike tropical rain forests, a temperate rain forest may be largely composed of **deciduous** trees.

shovelnose salamander



spotted salamander

Weller's salamander



SNOW IN THE RAIN FOREST!

North Carolina's mountains are rich and lush because they get so much **precipitation**. Each year, more than 100 inches of moisture fall in some places, qualifying them as rain forests. Part of this precipitation comes during the winter as snow. Unlike tropical rain forests where temperatures remain relatively stable but hot, temperatures in our rain forests occasionally reach below zero in winter, but rise into the 90s during summer. Because of the wide range of conditions, plants and animals in our mountain rain forests have adapted to a life of extremes.

WHAT LIVES IN OUR RAIN FOREST?

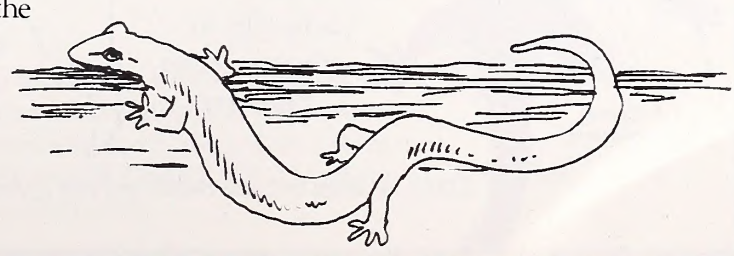
It is so humid and wet in our mountain rain forests that growing conditions are ideal. More than 2,300 species of **vascular plants** grow there, an amount unequaled anywhere else in North America. All these plants offer food and shelter for an amazing variety of animals.

The forest floor is almost always cool and damp, even in times of intense summer heat, thanks to the thick **forest canopy** overhead. Mosses, lichens, ferns and other plants carpet the rich but thin soils that cover the hidden **bedrock** below. Where the thin soils have eroded away, steep rock faces harbor tenacious plants that cling to small cracks and soil-filled indentations. Clear, cool groundwater seeps to the surface on exposed rocks, providing special habitats for moisture-loving plants and small animals such as salamanders.

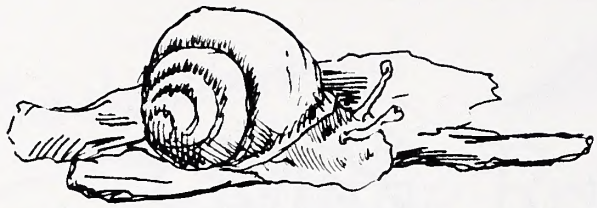
mountain dusky salamander

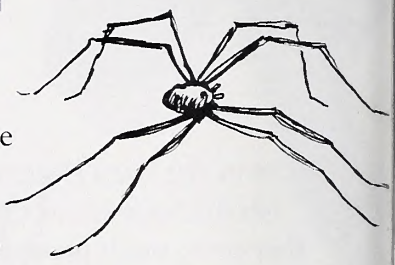
MILLIONS OF SALAMANDERS

There are more species of salamanders in North Carolina's mountain rain forests than anywhere else in the world. These secretive little amphibians hide in wet rock crevices, under boulders, beneath fallen logs, and in the many streams that drain the forest. At night they emerge to feed on small forest **invertebrates**.



North Carolina WILD Notebook

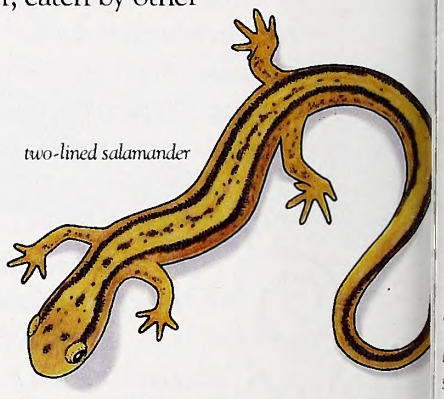




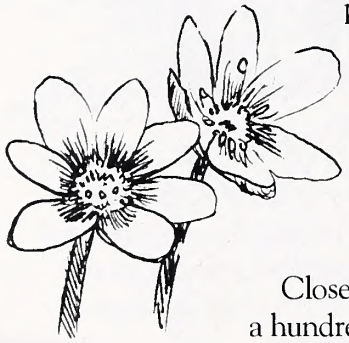
Small invertebrates are everywhere. Slippery slugs and snails, brightly colored millipedes and crawling or flying insects feed on decaying plants and animals. The material that passes through their bodies helps build the rich rain forest soil. Invertebrates are, in turn, eaten by other forest inhabitants, both large and small.

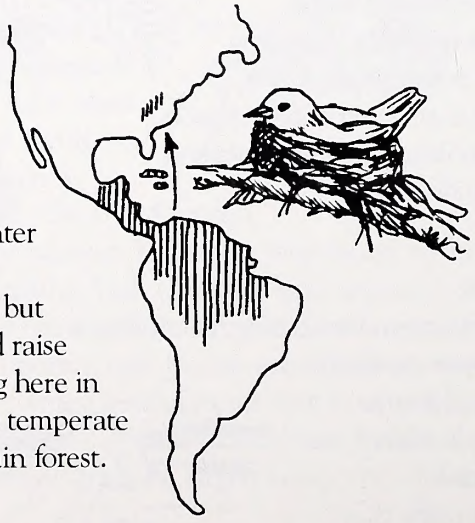
slimy salamander

Colorful mushrooms decorate stumps, standing trees, fallen logs, and the soil itself. These mushrooms are the fruiting bodies of hundreds of species of **fungi**. Western North Carolina hosts a greater variety of fungi than anywhere else on earth, partly because of the magnificent variety of plants on which many mushrooms depend. Likewise, many rain forest trees and wildflowers could not survive without their hidden fungal partners.

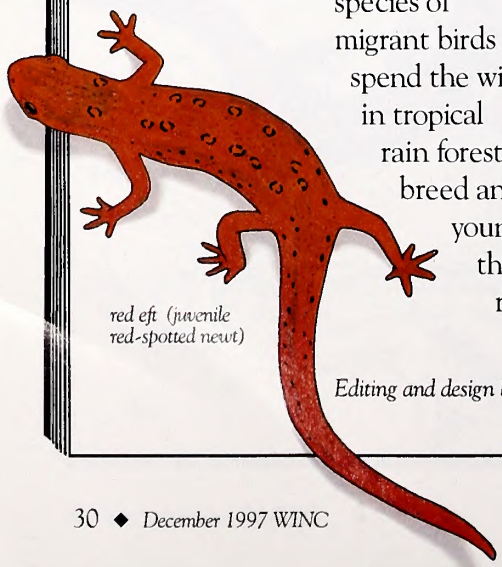


two-lined salamander





Close to a hundred species of migrant birds spend the winter in tropical rain forests but breed and raise young here in the temperate rain forest.



red eft (juvenile red-spotted newt)

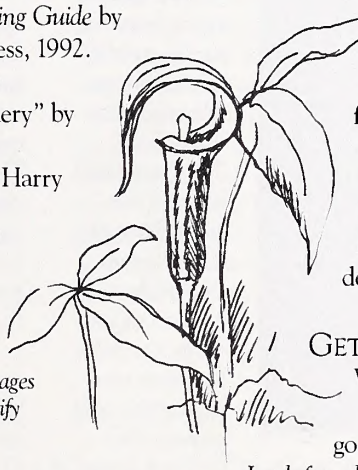
Editing and design by Consie Powell. Art Puzzle by Anne Marshall Runyon.

North Carolina WILD Notebook

Read and Find Out

- *Amphibians and Reptiles of the Carolinas and Virginia* by Bernard S. Martof et al., University of North Carolina Press, 1980.
- *Eastern Forests* by Ann Sutton and Myron Sutton, Alfred A. Knopf, 1985.
- *Katya's Book of Mushrooms* by Katya Arnold and Sam Swope, Henry Holt and Co., 1997.
- *North Carolina Wildlife Viewing Guide* by Charles E. Roe, Falcon Press, 1992.
- In *Wildlife in North Carolina:*
  - "All Things Cold and Slithery" by Vic Venters, May 1990.
  - "Valley of Mushrooms" by Harry Ellis, March 1985.
  - "A World of Salamanders" by Harry Ellis, April 1979.

The salamanders crawling on these pages are life-size. They may help you identify salamanders you find in the woods.



What Does It Mean?

tropical rain forest: rich and diverse forest type with warm enough temperatures to support year-round plant growth, characterized by annual precipitation of at least 100 inches.

temperate rain forest: rich and diverse forests found in moderate climatic zones characterized by high rainfall and abundant plant and animal life.

deciduous: broad-leaved species of trees that lose their leaves each year.

precipitation: moisture deposited on earth by rain, sleet, snow, hail and mist.

vascular plants: plants that contain a specialized conducting system to transport water and nutrients.

forest canopy: highest layer of growing tree branches and leaves in a forest.

bedrock: large formations of solid rock underneath the soil layer.

invertebrates: animals without an internal skeleton or spinal column.

fungi (singular: fungus): plant-like organisms that lack chlorophyl and derive their nutrition from other plants.

Get Outside

Visit a rain forest: Take a trip to the mountains and hike some of the trails. The *North Carolina Wildlife Viewing Guide* can give you some good ideas about where to go.

Look for salamanders: To find salamanders, carefully turn over rocks, fallen logs or other ground debris for woodland salamanders, or look under rocks in very shallow or wet soil around the edges of streams and seepages. Do this carefully; other creatures live there too. Look at salamanders without harassing or touching them. *Always* replace whatever you look under back in its original position.

Make a mini-rain forest with lichens: In a large jar or small aquarium, place a layer of gravel, covered by several inches of soil. Add a few fallen leaves, little shade-loving plants, and a few sticks and rocks. Water it well, and cover with a piece of glass or some plastic wrap. Put near a window, but not in direct sunlight. It will become warm and humid, like a rain forest. Find some lichens on fallen twigs or branches, let them dry out a day or two, then put them in your rain forest. Watch how the lichens absorb water from the humid air, swell, and become soft.

spring salamander

It's Wild!

Project WILD activities for teachers and students that correlate to this topic include:

Eco-Enrichers: Students learn how plant and animal matter contributes to soil and how wildlife contributes to the diversity of ecological systems.

Drawing On Nature: Students learn how wildlife and nature are important inspirations for art and science.

Good Buddies: Students learn about the intricate web of interdependence within which all plants and animals live.

Rainfall and the Forest: Students learn ways that rainfall influences different environments.

Let Us Know

Where did you go to visit our rain forest? What kinds of salamanders or other critters did you see? If you made some drawn or written field notes, please share some of them with us. Mail them to North Carolina WILD Notebook, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

Wildlife Commission Approves Funding to Expand South Mountains Game Land

KEN TAYLOR

***With its unspoiled** streams and forests, the Rollins tract represents one of the largest undeveloped pieces of land left in the Piedmont. Thanks to public and private funding, the 17,829-acre tract should be transferred to the N.C. Wildlife Resources Commission early next year where it will be protected for wildlife habitat and outdoor recreation.*

Written and Edited by Rodney Foushee

One of the largest remaining wilderness areas in the Piedmont will be permanently preserved for wildlife habitat and outdoor recreation thanks to the contributions of North Carolina taxpayers through several innovative trust programs.

The N.C. Wildlife Resources Commission has been awarded $11.2 million in public funds to purchase the 17,829-acre Rollins tract in the South Mountains near Morganton. The Rollins tract, which spans three counties and borders South Mountains State Park, is a haven for wildlife including black bears, bobcats, wild turkeys and migratory songbirds. Pristine headwater streams on the rugged property support wild trout while the area's unique rock outcrops and forests shelter at least 20 species of rare plants.

With the addition of $2 million in private funds and $1.15 million from the commission itself, the Rollins tract should be transferred to the Wildlife Commission by early next year where it will be managed as a game land for public hunting, fishing, hiking and other outdoor recreation. The land is at present owned by a private investment company.

A good portion of the money to purchase the Rollins tract came from the newly created Clean Water Management Trust Fund. The brainchild of state Sen. Marc Basnight, the program sets aside a portion of unspent tax dollars each year to improve and protect the water quality of Tar Heel rivers and streams. At its first meeting in July, the Clean Water Management Trust Fund board awarded the Wildlife Commission $4.2 million to purchase 5,600 acres of the Rollins tract, which includes the headwaters of the First Broad River. The river serves as the primary drinking water supply for more than 41,000 people in Shelby, Boiling Springs and Cleveland County.

Another $2 million for the Rollins tract was awarded to the Wildlife Commission from the Natural Heritage Trust Fund board. The trust, established 10 years ago, receives a portion of property deed stamp and personalized license plate sales to purchase significant Tar Heel natural places. The N.C. General Assembly also kicked in another $5 million to buy what many believe is one of the last chances to conserve a large tract of land in the rapidly growing Piedmont.

The final piece of the funding puzzle fell into place in October when the Wildlife Commission unanimously agreed to chip in the balance—$1.15 million—from its Wildlife Endowment Fund. This fund is derived from the sale of lifetime hunting and fishing licenses, lifetime subscriptions to *Wildlife in North Carolina* and tax-deductible contributions.

"This is a once-in-a-lifetime opportunity to protect an intact forest ecosystem in one of the fastest-developing regions of the state," said J. Merrill Lynch, assistant director of protection for The Nature Conservancy's N.C. chapter. The Nature Conservancy, along with the Foothills Conservancy, a local land trust, is negotiating the purchase for the Wildlife Commission.

The Rollins land represents the largest privately held tract left in the Piedmont, Lynch said. Combined with the nearly 13,000-acre South Mountains State Park and a smaller parcel held by the N.C. Department of Agriculture, the purchase will double the acreage in the heart of the South Mountains protected by public ownership. "This represents a huge island of forest and wildlife in an ocean of development," Lynch said.

Besides the benefit to wildlife, the expansion of the South Mountains Game Land will open up a variety of sorely needed outdoor pursuits including hunting to an estimated one-quarter of the state's population that lives within a 70-mile radius of the property.

"This will probably be the most significant land acquisition for the Wildlife Commission in the Foothills and Piedmont of North Carolina," said Hal Atkinson, the Wildlife Commission's wildlife management chief. "This purchase is not only unique for the size of the tract and the abundance and variety of wildlife, but for its location near a large human population that badly needs public hunting opportunities. We look forward to managing this excellent resource for the people of North Carolina."

Topo Maps for the Holidays

Whether your recreation is hunting, fishing, hiking, bird watching or boating, good maps are a necessity for success and safety in the outdoors. They also make great holiday gifts for all outdoor enthusiasts.

Thankfully, the North Carolina Geological Survey stocks topographic maps for every area of the state at a cost of $4 per map. In addition to topo maps, there is also a wide selection of geological publications available, many pertaining to recreational geology.

The Geological Survey's map and publication sales office is located in the basement of the Archdale Building at 512 N. Salisbury St. in Raleigh. To place orders or request more information, call (919) 715-9718 or write the N.C.G.S. at P.O. Box 27687, Raleigh, NC 27611-7687. Orders can also be faxed to (919) 733-0900 or placed by email at ncs1440@interpath.com.

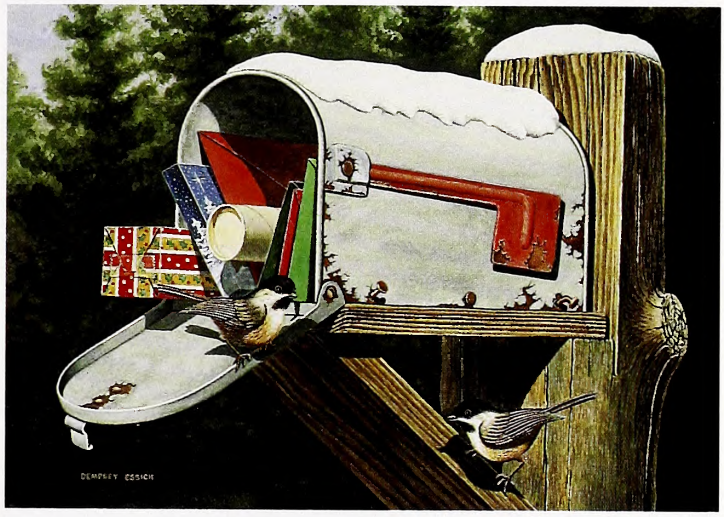
Maps are shipped the same day orders are received. Sales are subject to a 6 percent sales tax and a small handling fee. MasterCard and VISA credit cards are accepted as well as personal checks.

Field Notes

Eastern Gun Deer	Through Jan. 1
Central Gun Deer	Through Jan. 1
Western Gun Deer	Closes Dec. 13
Northwestern Gun Deer	Closes Dec. 13
Black Bear	See *Regulations Digest*
Wild Boar	Dec. 15-Jan. 1
Gray Squirrel	Through Jan. 31
Fox Squirrel	See *Regulations Digest*
Rabbit	Through Feb. 28
Pheasant (Nonnative, males only)	Through Jan. 31
Fox	See *Regulations Digest*
Raccoon and Opossum	See *Regulations Digest*
Bobwhite Quail	Through Feb. 28
Ruffed Grouse	Through Feb. 28
Mourning Doves (third season)	Dec. 17-Jan. 15
Common Snipe	Through Feb. 28
Crow	See *Regulations Digest*
Waterfowl	
Ducks, Mergansers and Coots	Through Jan. 20
Sea Ducks	Through Jan. 20
Snow and Blue Geese	Through March 10
Brant	Through Jan. 20
Youth Waterfowl Hunt Day	Jan. 24
Swan (by permit only)	Through Jan. 31

Information on bag limits, either-sex deer seasons and other regulations may be found in the *1997-98 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission. **For more information on waterfowl regulations and limits, call 1-800-675-0263.**

The 1998 North Carolina Wildlife Calendar Is Here!



Dempsey Essick's "Chickadee's Watch" is one of 12 fine paintings featured in the 1998 North Carolina Wildlife Calendar. Order now before they're sold out.

The works of Robert C. Flowers, James A. Brooks, Robert B. Dance, Dempsey Essick, Bob Herr, Denise Nelson, Duane Raver and Raney G. Rogers are featured in the 1998 North Carolina Wildlife Calendar.

Order yours today! Payment must accompany your order. Calendar orders may be charged to VISA or MasterCard, or enclose your check or money order (payable to NCWRC). Complete the form below and mail with payment to:

1998 Calendar, N.C. Wildlife Resources Commission
512 N. Salisbury Street, Raleigh, N.C. 27604-1188
(Office is located at 322 Chapanoke Road in Raleigh.)

GREAT CHRISTMAS GIFT!

Please send me _____ Calendars at $6.00 each .....$_____

All N.C. residents add $.36 sales tax per calendar ..... _____

☐ Enclosed is my check for **total** payment of .....$_____

☐ Charge to MasterCard or VISA for the calendar(s) ordered above. My card number is _____ and the expiration date is _____/_____.

_____ (_____)_____
Card holder signature | Day Time Phone No.

If ordering 7 or more calendars, please provide your UPS deliverable address.

Name _____

Address _____

City/State/Zip_____

Phone (_____) _____

All orders must be prepaid. A $20 charge will be made on returned checks (N.C.G.S. 25-3-512). **For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CAL098

Hunting Opportunities Increase for Disabled Sportsmen

TERRY SHANKLE

The support of private landowners, *along with several existing public programs, has increased the hunting opportunities and chances at success in the field for disabled Tar Heel sportsmen.*

Though access and hunting opportunities have improved for disabled North Carolina sportsmen in recent years, additional chances at success in the field are possible with the support of private landowners.

In its second year of sponsoring special deer hunts for the disabled, Murphy Family Farms, based in Rose Hill, has two hunts planned this season on a 6,100-acre woodland tract in Bladen County. The first special hunt for was set for Nov. 1. A second hunt for disabled sportsmen is planned for Dec. 5. Besides a chance at taking a deer, the company provides transportation, special covered blinds and food for the hunters.

"We have such a tremendous tract of land in Bladen County that we manage for wildlife," said Murphy Farms' wildlife biologist Andy Adams. "With this land, we have the opportunity to give people with disabilities a chance to enjoy the outdoors. When you see the satisfaction in their eyes after the hunt, it is all worth it."

The company also sponsors youth hunts on the property and is considering hold a "women's-only" hunt next year. For more information about any of the Murphy Farms hunts, call Adams at 1-800-311-9458 ext. 4520.

Disabled North Carolina hunters can also participate in special deer hunts on public game lands managed by the N.C. Wildlife Resources Commission. The Commission's Disabled Sportsman Special Hunt Program provides qualified disabled hunters and their companions with more than a dozen either-sex deer hunts through the early part of the hunting season. Participants are issued annual identification cards and access permits for a $10 processing fee.

The Commission's Disabled Access Program allows hunters with limited physical mobility to use vehicles on certain game lands that are otherwise closed to traffic. Access to qualified hunters and their companions is available on the following game lands: Bladen Lakes, Caswell, Goose Creek, Holly Shelter, Roanoke River Wetlands, Sandhills and Thurmond Chatham.

Disabled hunters also have access to a special waterfowl blind on the Goose Creek Game Land. Participants in the free program are issued permanent identification cards, companion cards and vehicle access permits valid for as long as the disability exists.

Hunters who are incapable of drawing a normal bow because of a long-term or permanent disability can apply for a special crossbow hunting permit from the Wildlife Commission at no charge.

Medical proof of a physical disability is required to participate in the various Wildlife Commission programs. For more details, consult pages 44-45 of the 1997-98 *North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* or call the Wildlife Commission's License Section at (919) 662-4370.

CP&L Supports Community Fishing Program

MELISSA McGAW

Carolina Power & Light Co. *manager Ben White (left) presents a $3,000 check to Wildlife Commission Chairman Jim Bennett to support the Commission's Community Fishing Program. The money will be used to buy tackle for the Fishing Tackle Loaner Program, which helps youths get involved with fishing. CP&L is the program's first corporate sponsor.*

Conservation Awards Deadline Nears

Each year, the North Carolina Wildlife Federation presents the prestigious Governor's Conservation Achievement Awards to honor individuals, government agencies, private associations and others who exhibit an unwavering commitment to conservation in North Carolina. These are the highest conservation awards given in the state.

By recognizing and honoring conservation leaders—both young and old, professional and volunteer—the N.C. Wildlife Federation hopes to inspire all North Carolinians to take a more active role protecting the natural resources of our state.

The deadline for making nominations for the 1997 awards in any of 17 conservation categories is Dec. 15. Awards are given for conservation of the following resources: wildlife, land, water, air and forests. Awards are also given for Conservationist of the Year, Environmental Educator of the Year and Conservation Organization of the Year, among others.

The awards will be presented at the N.C. Wildlife Federation's annual banquet on February 21. Award recipients receive a handsome statuette and a certificate.

For more information about the award categories or to receive a nomination form, call the N.C. Wildlife Federation at 1-800-264-NCWF.

Outdoor Calendar of Events

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent at least four months in advance.

Dec. 6-7

The 10th annual Core Sound Decoy Festival will be held at Harkers Island Elementary School on Harkers Island. The festival will feature old and new decoy exhibits, carving demonstrations and competitions, educational exhibits, retriever demonstrations, and coastal food and drinks. For more information, call the Core Sound Waterfowl Museum at (919) 728-1500.

Dec. 6-7

The Roanoke Valley Wildlife Expo will be held at the Kirkwood Adams Community Center in Roanoke Rapids. The event, sponsored by Bucks Unlimited and the N.C. Cooperative Extension Service, will feature wildlife management seminars, wild game cooking demonstrations, a big buck contest, wildlife art exhibits and a free hunter safety course. For more information, call Fred Atkinson at (919) 537-2060.

Jan. 30- Feb. 1

The East Carolina Wildlife Arts Festival and North Carolina Decoy Carving Championships will be held at the Civic Center in Washington. The festival, sponsored by the East Carolina Wildfowl Guild, will bring together some of the nation's best wildlife artists, carvers and related exhibitors. Highlights of the weekend will include the state decoy carving championships and a wildlife art and decoy auction. The original painting to be used for the 1998 North Carolina Duck Stamp will also be unveiled at the festival. For more information, contact Show Chairman David Gossett at (919) 946-2897.

Catch Us at These Numbers

- **1-800-662-7137** to report violations of hunting and fishing laws.
- **1-800-628-3773** (NC VESSEL) for boat registration and titling.
- **1-800-675-0263** for hunting dates and shooting hours for migratory game birds.
- **1-888-248-6834** (2HUNTFISH) to purchase most licenses with VISA or MasterCard using a touch-tone telephone.
- **1-800-446-8663** (I GOT ONE) to report big game harvests.
- Connect to the Commission's online web site at **http://www.state.nc.us/Wildlife/**

The N.C. Wildlife Resources Commission maintains five toll-free telephone numbers to provide better services and convenient access to information for North Carolina citizens. Calls are answered in order, but some numbers may require a wait during busy seasons.

VISA MasterCard

Wildlife Endowment Fund Report

Totals Through September 1997

Principal Balance
$24,183,782.25

Interest Earned
$24,084,739.45

Total Receipts
$48,268,521.70

Interest Used
$12,329,807.04

Fund Balance
$35,938,714.66

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.

Wildlife In North Carolina 1997 Index

Article	Author/Photographer	Topic	Issue
Art/Photo Portfolio			
Season of the Wood Duck	F. Eugene Hester, Jack Dermid	Wood ducks	Feb.
The Crabber's Cadence	Eddie Nickens	Crabbing	March
Sheer Delights	Ken Taylor	Wooden sailboats	May
A Harry Ellis Portfolio	Harry Ellis	Harry Ellis photos	Aug.
Commission Activities			
Letter to the Governor	John F. Lentz, Chairman	Biennial Report	Jan.
A Legacy of Leadership	Staff	Biennial Report	Jan.
Division of Enforcement	Staff	Biennial Report	Jan.
Division of Wildlife Management	Staff	Biennial Report	Jan.
Division of Boating and Inland Fisheries	Staff	Biennial Report	Jan.
Division of Conservation Education	Staff	Biennial Report	Jan.
Division of Administrative Services	Staff	Biennial Report	Jan.
Personnel Section	Staff	Biennial Report	Jan.
N.C. CATCH for Kids	Celeste Wescott-Maus	N.C. CATCH	April
Licenses to Go!	Rodney Foushee	New license system	June
N.C. WILD: Don't Teach Without It	Celeste Wescott-Maus	N.C. WILD	July
Conservation, Environment			
Treasures in Trust	Gina Rutherford	Natural Heritage Trust	July
Fisheries Management			
Trout Worth Waiting For	Jim Borawa	Delayed harvest waters	April
Certify That Trophy Fish	Keith Ashley	Recognition program	July
Jordan Lake Bass: The Tourniquet That Worked	Dan Kibler	Jordan Lake bass	Aug.
Fishing, Freshwater			
Four Ways for Walleyes	Gerald A. Almy	Walleyes	March
Bass Pros Talk Spinnerbaits	Soc Clay	Bass	March
Flies, But No Flyrod	Jeff Samsel	Trout	April
Tiny Soft Plastics for Bass	Gerald A. Almy	Bass	May
Fishing the Floaters	Gerald A. Almy	Topwater bass	June
Terrestrials Revisited	Gerald A. Almy	Trout flies	July
Pinpointing Pressured Bass	Mike Gaddis	Bass	July
Floating 'n Fishing	Gerald A. Almy	Float fishing tips	Aug.
Hunting, Big-Game			
Get Tough with Your Bow	Mike Gaddis	Archery	March
Team Up for Turkeys	Gerald A. Almy	Turkey tactics	April
Solving 10 Tough Deer Problems	Gerald A. Almy	Deer hunting	Oct.
How Big Is That Rack?	Gerald A. Almy	Trophy deer hunting	Nov.
Hunting, Small Game and Waterfowl			
Grouse in the Two-Tracks	Soc Clay	Grouse hunting	Feb.
First to Tree	Mike Gaddis	Squirrel dog field trials	Feb.
Dove Potion Number Nine	John Crew	Dove decoys	Aug.
Ten Ways to Improve Your Dove Shooting	Eddie Nickens	Dove hunting tips	Sept.
Hunting Season Roundup, 1997-98	Staff	Hunting seasons	Sept.
Encourage Your Pup to Brilliance	Mike Gaddis	Dog training	Oct.
Natural History and Wildlife			
At Large on Cedar Island	Bland Simpson	Cedar Island	Feb.
Eel Excursions	David Lee	Eels	March
High, Wide and Handsome	Harry Ellis	Mountain balds	May
Planet Jar	Ted Dossett	Pond microcosm	May
Winds of Change	Rodney Foushee	Hurricanes	June
Frog Nights	David Lee	Frog songs	June
Flying Cigars	David Lee	Swifts	Sept.
Joyce Kilmer's Birds: New Thoughts on an Ancient Forest	David Lee	Birds	Oct.
Skull Sessions	Mary Kay Clark	Animal skulls	Nov.
The Bull Neck of Heart's Delight	Bland Simpson	Bull Neck Swamp	Dec.
Carolina Cooldown	Carla Burgess	Hibernation	Dec.
Nature's Ways			
Taxonomy and Life	Lawrence S. Earley	Taxonomy	Feb.
Sap, Resin and Other Tree Fluids	Lawrence S. Earley	Tree Sap	March
Master Builders	Lawrence S. Earley	Bird nests	April
Knowing Your Place	Lawrence S. Earley	Sunfish niches	May
After the Storm: Pools	Lawrence S. Earley	Ephemeral pools	June
After the Storm: Wood Decay	Lawrence S. Earley	Wood decay	July
Our Leggy Crustaceans	Lawrence S. Earley	Shrimp	Aug.
The Chemical Defenses of Plants	Lawrence S. Earley	Plants	Sept.
Being Amphibian	Lawrence S. Earley	Amphibians	Oct.
The Tales That Scales Tell	Lawrence S. Earley	Fish scales	Nov.
Vertical Birds	Lawrence S. Earley	Bird adaptations	Dec.
N.C. WILD Notebook			
Who Cooks for You?	Consie Powell	Owls	Oct.
Awww Nuts!	Consie Powell	Hard mast	Nov.
Visit the Rain Forest	Consie Powell	Mountain forests	Dec.
North Carolina History			
The Last Turpentiner	Lawrence S. Earley	Turpentine	June
Boats That Fit	Ted Dossett	Early boats	July
Early Hikers in the Smokies	Eddie Nickens	Historic mountain hike	Sept.
Southern to the Core	Ted Dossett	Southern apples	Oct.
Hickory Milk and Yaupon Tea	Burt Kornegay	Indian foods	Oct.
N. C.'s Historic Waterfowl Decoys	Neal Conoley	Old decoys	Dec.
Outdoor Recreation			
Along for the Ride	Burt Kornegay	Canoeing	Feb.
Idiot's Guide to Camping	Eddie Nickens	Camping tips	May
A Flight of Spirit	Mike Gaddis	Bow making	Aug.
September's Gift	Mike Gaddis	Winemaking	Sept.
For Pete's Sake	Mike Gaddis	Outdoor memories	Dec.
Our Natural Heritage			
Revenge of the Snapper	Jim Dean	Snapping turtles	Feb.
The Roanoke's Shad Surprise	Jim Dean	Shad fishing	March
When Mickey Meets Vickie	Jim Dean	Anthropomorphism	April
The Fish from Hades	Jim Dean	Chain pickerel	May
Horses and Beaches	Jim Dean	Wild horses	June
Saying Goodbye to a Landmark	Jim Dean	Emerald Isle Pier	July
A Good Bait, But Not a Great Bait	Jim Dean	Fish baits	Aug.
The Truth About Blaze Orange	Jim Dean	Humor	Sept.
Bullets Facing Forward	Jim Dean	Marksmanship	Oct.
Back to Bluegill	Jim Dean	Memories	Nov.
Thinking About Animals, and Vice-Versa	Jim Dean	Animals	Dec.
Profiles, Personalities			
Harry Ellis: Native Naturalist	Elizabeth Hunter	Harry Ellis	Aug.
Big Tom Wilson	Tim Silver	Big Tom Wilson	Nov.
Wildlife Management			
Small Game Part II: What's Next for Rabbits and Quail?	Carl Betsill, Terry Sharpe	Small game	April
The Truth Is in the Teeth	Dan Kibler	Deer teeth	Sept.
Paper Ducks?	Dennis Luszcz	Duck population counts	Nov.
Bear 187, Where Are You?	Roger Powell	Pisgah bears	Nov.
Gorged On Geese	Rodney Foushee	Snow geese	Dec.
Wildlife Through The Year			
Planting, Pruning, Planning	Rodney Foushee	Wildlife plantings	Feb.
Time for the Birds	Rodney Foushee	Bird tips	March
Fishy Business	Rodney Foushee	Pond management	April
Planting for Doves	Rodney Foushee	Dove management	May
Hurricane Beavers	Rodney Foushee	Beavers	June
Birds for the Future?	Rodney Foushee	Bird conservation	July
Too Much of a Good Thing	Rodney Foushee	Nusiance goose control	Aug.
Food for Thought	Rodney Foushee	Aflatoxin	Sept.
Fall Roundup	Rodney Foushee	Fall wildlife tips	Oct.
Boxes for Wood Ducks	Rodney Foushee	Wood duck management	Nov.

N.C. WILD STORE

Explore the Mysteries of Nature

NATURE'S WAYS

Natural History Essays from Wildlife in North Carolina

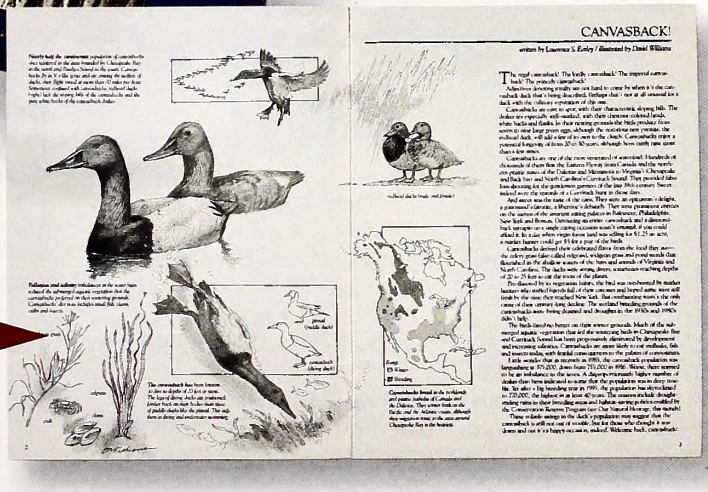
Why do some birds decorate their nests with snake skins? Why is the Roanoke bass found in only a few rivers in North Carolina? How did the ivory-billed woodpecker become extinct?

For nearly 20 years, the illustrated "Nature's Ways" columns in the pages of *Wildlife in North Carolina* have answered scores of questions like these in brief, entertaining essays. Now more than 200 of these essays have been collected in six paperback volumes that will delight readers, young and old, with their eye-opening insights into North Carolina's natural curiosities.

A wonderful gift for every nature lover!

Sold only as a 6-volume set. **$27.50.**
ITEM CODE **M9**

Short essays and beautiful illustrations have been the formula to the popularity of "Nature's Ways" over the years. This article on the comeback of the canvasback duck in North Carolina is one of over 200 articles in the collection. They can easily be photocopied and used in the classroom, and parents and children also can read them together at home.


CANVASBACK!

More terrific items

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

N.C. WILD STORE

White, 100% cotton (preshrunk) T-shirts are guaranteed for comfort and durability. Each shirt features an original design.

N.C. WILD T-SHIRT
N.C. WILD logo printed on front and colorful art on back. $14.50.
ITEM CODES:
A4MED (medium)
A4LRG (large)
A4XLG (extra large)
A4XXL (extra extra large)

WILDLIFE IN N.C. T-SHIRT
WINC magazine logo on front pocket. Tundra swan art on back. $14.50.
ITEM CODES:
A5MED (medium)
A5LRG (large)
A5XLG (extra large)
A5XXL (extra extra large)

LIZARDS OF N.C.
Shows all 12 of the state's lizard species. 22" x 34". $6. ITEM CODE P3

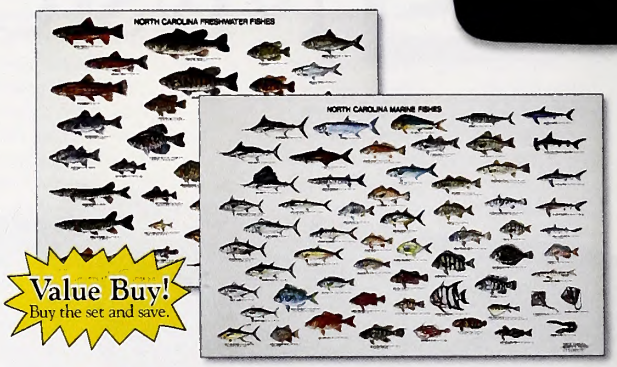
TURTLES OF N.C.
Shows all 21 of the state's turtle species. 22" x 34". $6. ITEM CODE P4

SNAKES OF N.C. (LIVEBEARERS) Shows all 17 of the state's livebearing snake species. 22" x 34". $6. ITEM CODE P5

SNAKES OF N.C. (EGGLAYERS) Shows all 19 of the state's egg-laying snake species. 22" x 34". $6. ITEM CODE P8

SET OF 4 POSTERS
You'll save $6 by purchasing the set of four posters above. $18.
ITEM CODE P10

N.C. WILD CAP
N.C. WILD logo is embroidered on a pro-shape, brushed-cotton twill cap with a Velcro® closure. Two-tone cap is tan/forest green. $16.50.
ITEM CODE A1

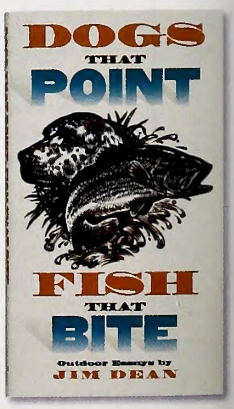


N.C. FRESHWATER FISHES
Find your favorite fish with this color poster showing 36 of the state's freshwater fishes. 28" x 22½". $6. ITEM CODE P6

N.C. MARINE FISHES
All the colors of the sea can be found on this poster of 60 marine fishes. 35" x 22½". $6. ITEM CODE P7

N.C. FRESHWATER FISHES AND N.C. MARINE FISHES
Save $2 when you buy both posters as a set. $10. ITEM CODE P9

WILDLIFE IN N.C. CAP
Buck deer silhouette with magazine logo is embroidered on a pro-shape, washed-canvas cotton cap with an adjustable cloth strap and buckle closure. Two-tone cap is navy/stone. $16.50.
ITEM CODE A2



DOGS THAT POINT, FISH THAT BITE
Here are 50 of the best "Our Natural Heritage" columns written by Jim Dean for *Wildlife in North Carolina* over the past 17 years. Published by the University of North Carolina Press and the N.C. Wildlife Resources Commission; hardbound; 220 pages. $19.95. ITEM CODE M8

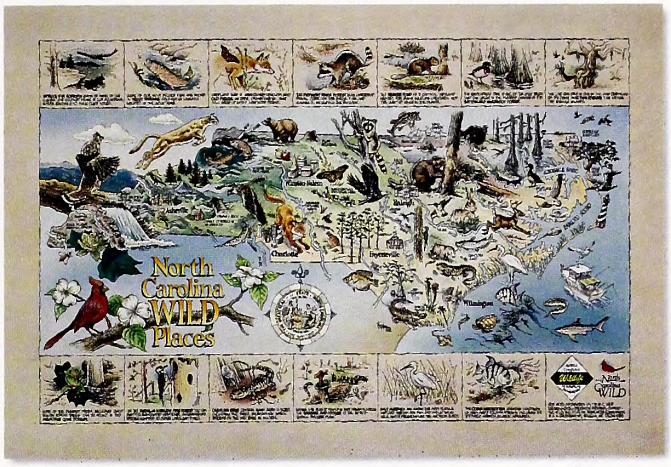
WILDLIFE IN N.C. CAP
Brook trout and magazine logo are embroidered on an unstructured, sage-colored, pigment-dyed cotton cap, with an adjustable strap. $16.50.
ITEM CODE A3

Wildlife in North Carolina Book

The best of *Wildlife in North Carolina* magazine. Hardbound. $12.
ITEM CODE M3

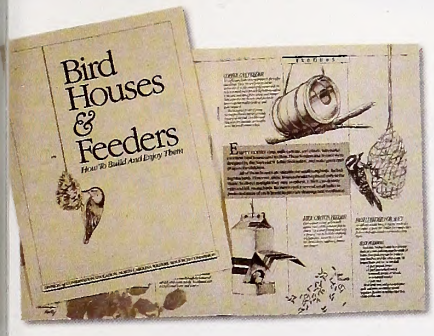
Magazine Binder

Store 12 issues of the magazine in this sturdy brown leather-look binder with gold lettering. $10.
ITEM CODE M2



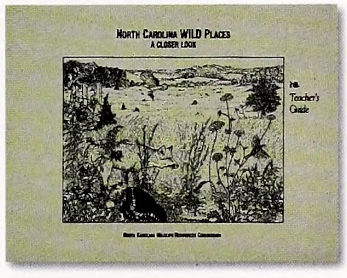
North Carolina WILD Places Map

Artist's Proof. $40. ITEM CODE E2
Limited Edition. $25. ITEM CODE E3
Poster. $6. ITEM CODE E4



Bird Houses & Feeders: How to Build and Enjoy Them

An eight-page illustrated guide to building bird houses and feeders. $2.
ITEM CODE M6



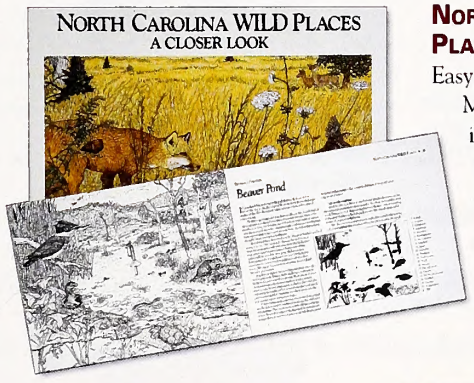
North Carolina WILD Places: A Closer Look Teacher's Guide

For teachers using *North Carolina WILD Places* in the classroom, these activities and games will heighten student awareness of wildlife habitats. $6.
ITEM CODE E7

Value Buy! Buy the set and save.

North Carolina WILD Places Posters

(Set of 3): Posters of "Old Field" and "Mountain Cove Forest" from *North Carolina WILD Places: A Closer Look*. 19 1/2" x 16". Shipped folded with poster version of WILD Places Map. $8. ITEM CODE E5



North Carolina WILD Places: A Closer Look

Easy-to-read text and Anne Marshall Runyon's delightful illustrations make wildlife habitats come alive in this 82-page book. Discusses 13 habitats across the state. $10.
ITEM CODE E1

WILD Places book and posters

Buy the *North Carolina WILD Places* book and all three posters and save! (Items E1 and E5) $16. ITEM CODE E6

N.C. WILD Notebooks

Each set contains eight issues of *North Carolina WILD Notebook*, the Wildlife Resources Commission's prize-winning conservation education newsletter.
$3 per set.

1995-1996 Set ITEM CODE E11
1996-1997 Set ITEM CODE E12

North Carolina WILD Journal

Handy calendar notes on wildlife behavior through the year, with room for personal observations. Supplements N.C. WILD Education Sites workshop. $6.
ITEM CODE E8

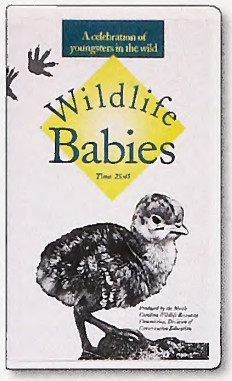
Scouting Correlations

Cub, Boy and Girl Scout requirements are correlated to Project WILD and Aquatic WILD activities. Supplements Scout leaders' planning materials and events. Each $3.
Cub & Boy Scout Correlation. ITEM CODE E9
Girl Scout Correlation. ITEM CODE E10

More terrific items

N.C. WILD STORE

Value Buy!
Buy the set and save.



Wildlife Babies

Entertaining 25-minute video version of the classic 1965 Jack Dermid film reveals springtime antics of young wood ducks, black bear, possums, cottontails and others. $20. ITEM CODE N9

All Things Are Connected

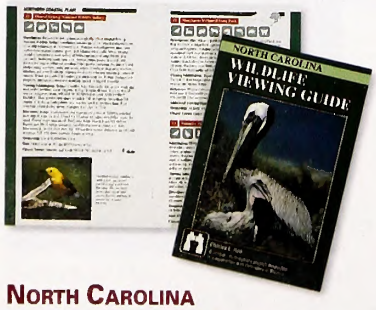
Stirring 12-minute video adaptation of Chief Seattle's speech introduces environmental ethics. $20.
ITEM CODE W1

This Land Is Sacred (Teacher's Guide)

Classroom activities to accompany All Things Are Connected video. $4.50. ITEM CODE W2

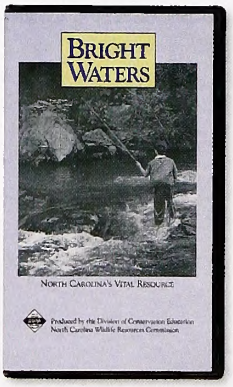
All Things Are Connected & This Land Is Sacred

Video and Teacher's Guide package. $22. ITEM CODE W3



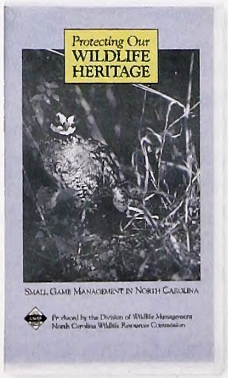
North Carolina Wildlife Viewing Guide

This color guide will lead you to 90 of the state's best wildlife viewing sites. $5.95. ITEM CODE N6



Bright Waters (Video)

30-minute video on fishing and fisheries management in North Carolina's freshwater creeks, rivers and ponds. $20. ITEM CODE N7



Protecting Our Wildlife Heritage (Video)

25-minute video offers useful tips for landowners on managing small game. $20. ITEM CODE N8

Gardens for Butterflies

Article reprint from *Wildlife in North Carolina* magazine for the gardener who wants to attract some of nature's most colorful creatures. $2. ITEM CODE M5

WILDlife Profiles

Each set is designed to fit your standard 3-ring binder and features 10 animal fact sheets. $2 per set.

Set 1. Black bear, raccoon, white-tailed deer, striped skunk, bobwhite quail, wild boar, muskrat, mourning dove, coyote, mallard. ITEM CODE W4

Set 2. Mink, canvasback duck, red fox, wild turkey, beaver, American river otter, Canada goose, bobcat, red wolf, cougar. ITEM CODE W5

Set 3. Humpback whale, black duck, osprey, clapper rail, red-shouldered hawk, cottonmouth, diamondback terrapin, largemouth bass, black crappie, channel bass. ITEM CODE W6

Set 4. Brook trout, garden spider, Tar spiny mussel, wood duck, bullfrog, mayfly, tiger salamander, bog turtle, hellbender, shortnose sturgeon.
ITEM CODE W7

Set 5. Cottontail rabbit, gray squirrel, northern flying squirrel, newt, common crow, red-tailed hawk, prothonotary warbler, bluegill, striped bass, Eastern oyster. ITEM CODE W8

Set 6. Opossum, peregrine falcon, Eastern bluebird, American toad, rat snake, Eastern glass lizard, smallmouth bass, brown trout, monarch butterfly, Virginia big-eared bat. ITEM CODE W9

Set 7. Chipmunk, gray fox, bald eagle, loggerhead shrike, common snapping turtle, five-lined skink, bluefish, rainbow trout, grasshopper, horseshoe crab.
ITEM CODE W10

Set 8. Appalachian cottontail, manatee, barred owl, turkey vulture, Neuse River waterdog, spring peeper, coral snake, American alligator, American eel, American shad. ITEM CODE W11

Set 9. Southern flying squirrel, fox squirrel, great horned owl, snowy egret, Southern leopard frog, corn snake, Atlantic sturgeon, walleye, luna moth, crayfish. ITEM CODE W12

Set 10. Marsh rabbit, woodchuck, hooded warbler, whippoorwill, green salamander, copperhead, fence lizard, muskellunge, chain pickerel, Scotch bonnet. ITEM CODE W13

Set 11. Atlantic croaker, Southern flounder, summer flounder, spot, king mackerel, Spanish mackerel, sea mullet, weakfish, spotted seatrout, striped mullet. ITEM CODE W14

N.C. WILD STORE ORDER FORM

Use this form to order educational products. Use the magazine subscription form inside for magazine orders.

Provide your shipping information here. Please give a street address; we cannot deliver to a post office box.

Name _____ Home phone (___)___-____
first name MI last name area code

Mailing Address _____

Shipping Address _____

City _____ State ___ Zip _____-____

ITEM CODE	ITEM NAME/DESCRIPTION	SHIRT SIZE	QUANTITY	PRICE	$ TOTAL

Make checks payable to: N.C. Wildlife Resources Commission. Send your order to: The N.C. WILD Store, PO Box 29607, Raleigh, N.C 27626-0607.

All orders must be prepaid. We do not bill. Please do not send cash. Allow 4 weeks for delivery of your order. $20.00 service charge for returned checks (N.C.G.S. 25-3-512). Products may be purchased over the counter at The N.C. WILD Store, 322 Chapanoke Road, Raleigh, N.C. Telephone (919) 662-4377.

→ (Do not include magazine subscriptions.) ..... **SUBTOTAL**	$
→ (Subtract 15% for retail orders of $100 or more.) ..... **DISCOUNT**	$
→ (N.C. residents add 6% sales tax.) ..... **TAX**	$
→ (See shipping chart below.) ..... **SHIPPING & HANDLING**	$
→ (Add all items above.) ..... **TOTAL**	$

For credit card orders, provide information below.

CREDIT CARD NUMBER

EXP. DATE

( )
Daytime Phone Number

Credit Card holder's signature

SHIPPING & HANDLING MUST BE INCLUDED OR ORDER WILL BE RETURNED
Shipping and handling based on subtotal.
$10.00 and under, **ADD** $2.00
$10.01 to$25.00, **ADD** $3.50
$25.01 and over, **ADD** $5.00

All proceeds from the sale of these products support the development and production of conservation education projects and programs.

LIFETIME LICENSES AND LIFETIME MAGAZINE SUBSCRIPTIONS

ENDOW 97

Complete and return entire page with proper payment (or credit card information). Our mailing address is: Wildlife Endowment Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Office is located at 322 Chapanoke Rd., Raleigh, N.C. 27603. Telephone (919) 662-4377. Please make checks payable to the Wildlife Endowment Fund. $20.00 service charge for returned checks (N.C.G.S.25-3-512).

PRICE

☐ Lifetime Comprehensive Fishing (residents only) (includes basic fish, trout and trout waters on game lands) $250.00
☐ Lifetime Subscription to *Wildlife in North Carolina* magazine $100.00

Infant and Youth Licenses:

☐ Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $200.00
☐ Personalized Lifetime Sportsman Infant (under 1 year of age) (Application must be received before one year of age) $205.00
☐ Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $350.00
☐ Personalized Lifetime Sportsman Youth (age 1 through 11) (Application must be received before 12 years of age) $355.00

A copy of a certified birth certificate (or the mother's copy) must accompany applications for sportsman's licenses for infants and youths.
Please note: Hospital copies will not be accepted. Also, birth certificates cannot be returned.

Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

☐ Lifetime Sportsman (residents only) (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $500.00
☐ Personalized Lifetime Sportsman (residents only) (age 12 or older) $505.00
☐ Lifetime Nonresident Sportsman (age 12 or older) (includes basic hunt and fish, big game, game lands, primitive weapons, trout, N.C. waterfowl [Federal waterfowl stamp is mandatory and must be purchased separately.]) $1,000.00
☐ Lifetime Comprehensive Hunting (residents only) (includes basic hunt, big game, game lands, primitive weapons) $250.00

On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or making out a written statement that he had such a license.

Check appropriate block and attach required copy

☐ Copy of Prior Year Hunting License ☐ Copy of Hunter Safety Certificate of Competence
☐ In lieu of copy, I am completing a written statement (complete below).

STATEMENT: I CERTIFY THAT I WAS A LICENSED HUNTER PRIOR TO JULY 1, 1991.

Date _____ Signature of Applicant _____

PLEASE TYPE OR PRINT LEGIBLY

Applicant Name: _____ (First) (Middle) (Last)

Address: _____ (Street/R.F.D.) (City) (State) (Zip)

Date of Birth _____ (Month/Day/Year) Social Security No.: _____ Driver's License No.: _____

Male: ☐ Female: ☐ Telephone Number: (____) _____ County _____

_____ Date _____ Applicant or Donor Signature

If a personalized lifetime sportsman's license is being ordered, please indicate your selection of letters, numbers, dashes, periods, commas and/or blanks. Only six spaces may be used.

____ ____ ____ ____ ____ ____

The personal message for the personalized sportsman's license may include up to 21 spaces, including letters, numbers, dashes, periods, commas and/or blanks. Please write in your message as you wish it to appear.

Donor's Name and Address (if applicable)

_____

_____

_____

_____

I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is a check for $ _____. Please make checks payable to the Wildlife Endowment Fund.

N.C. Wildlife Resources Commission Merchant #8430 0755 0

To charge your purchase to your VISA or MasterCard you MUST complete the form below (donations cannot be charged).

Card Holder's Name and Address (Please Print)

_____

_____

_____

_____

☐ VISA ☐ MasterCard

Expires_____/ _____ Acct. No. _____

Card Holder's Signature _____

MasterCard

VISA

DO NOT WRITE IN THIS SPACE FOR COMMISSION USE ONLY

_____ — — — — —

_____

Lifetime License $ _____

Lifetime Magazine $ _____

Total Charge $ _____

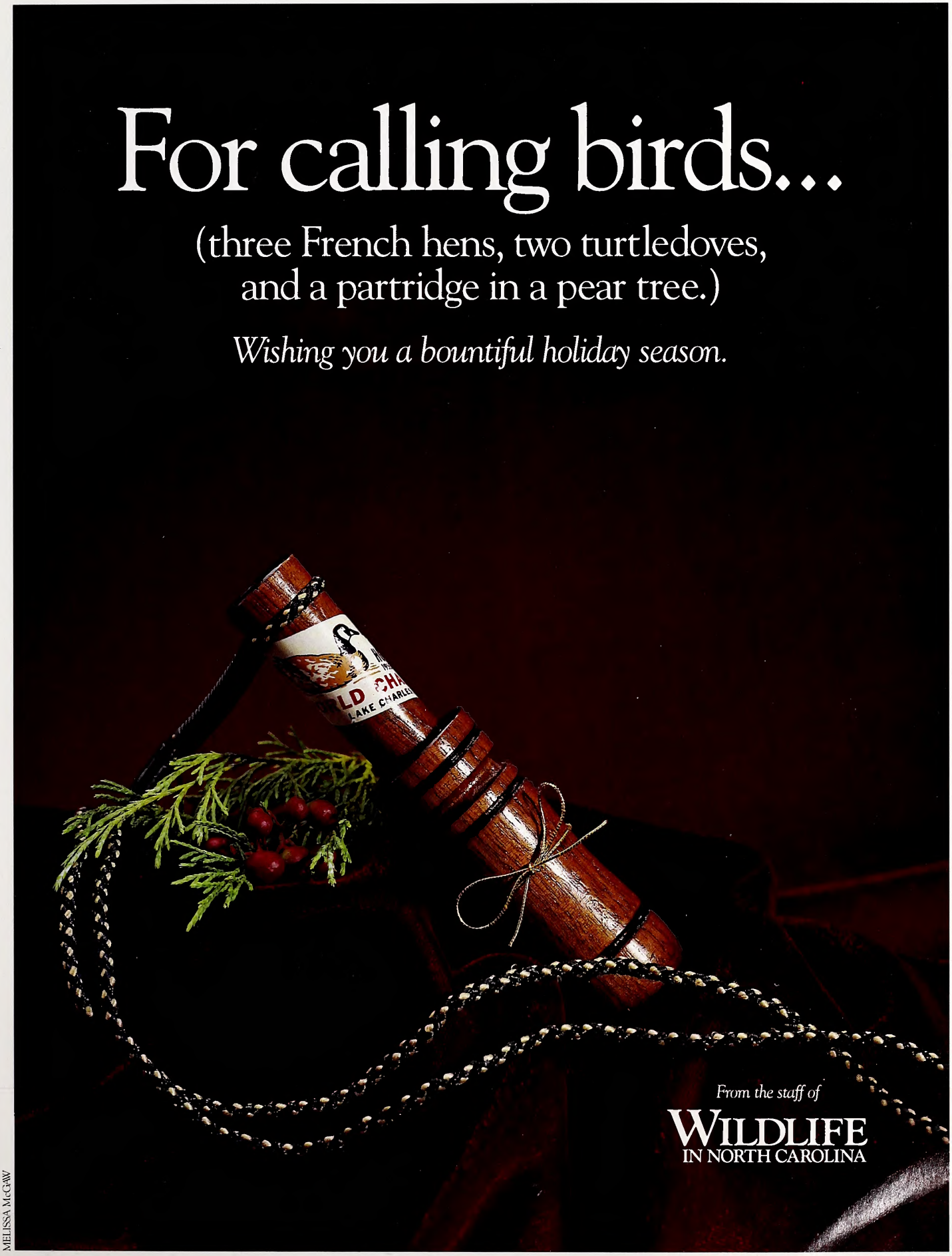
Authorization Code Number

_____

For calling birds...

(three French hens, two turtledoves,
and a partridge in a pear tree.)

Wishing you a bountiful holiday season.



From the staff of

WILDLIFE
IN NORTH CAROLINA

MELISSA McGAW

A Lingering Heritage

A flotilla of historic duck decoys floats in the reflecting pond in front of the old Whalehead Club in Currituck County, a reminder of the waterfowling legacy of eastern North Carolina. Left to right is a Ned Burgess coot, a John Williams ruddy duck, a Ned Burgess canvasback and a Wallace O'Neal widgeon.

Periodicals postage paid at
Hickory, North Carolina

LITHOGRAPHY BY THE HICKORY PRINTING GROUP,
CONOVER, NORTH CAROLINA

STATE LIBRARY OF NORTH CAROLINA
3 3091 00733 1283

HECKMAN
BINDERY INC.
SEPT 98
Bound-To-Please® N. MANCHESTER, INDIANA 46962